



(19) Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) Publication number:

0 204 285 B1

(12)

## EUROPEAN PATENT SPECIFICATION

(45) Date of publication of patent specification: 15.01.92 (51) Int. Cl. 5: C07D 471/04, C07D 487/04,  
A61K 31/44, A61K 31/495,  
(21) Application number: 86107418.5 // (C07D471/04,221:00,235:00),  
(22) Date of filing: 02.06.86 (C07D487/04,241:00,235:00)

The file contains technical information submitted  
after the application was filed and not included in  
this specification

(54) Imidazoheterocyclic compounds processes for preparation thereof and pharmaceutical  
compositions comprising them.

(30) Priority: 04.06.85 GB 8514080  
16.12.85 GB 8530878  
(43) Date of publication of application:  
10.12.86 Bulletin 86/50  
(45) Publication of the grant of the patent:  
15.01.92 Bulletin 92/03  
(84) Designated Contracting States:  
AT BE CH DE FR GB IT LI LU NL SE  
(56) References cited:  
EP-A- 0 033 094  
US-A- 4 450 164  
US-A- 4 507 294

(73) Proprietor: FUJISAWA PHARMACEUTICAL  
CO., LTD.  
3, Doshomachi 4-chome Higashi-ku  
Osaka-shi Osaka 541(JP)  
(72) Inventor: Ueda, Ikuo  
No. 2-11-95, Uenohigashi  
Toyonaka(JP)  
Inventor: Shiokawa, Youichi  
No. 9-814, Hozumidai  
Ibaraki(JP)  
Inventor: Take, Kazuhiko  
No. 1-14-19-457, Uriwarinishi  
Hirano-ku, Osaka(JP)  
Inventor: Itani, Hiromichi  
No. 2-2-10, Midorigaoka  
Ikeda(JP)  
(74) Representative: Türk, Gille, Hrabal  
Brucknerstrasse 20  
W-4000 Düsseldorf 13(DE)

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**Description**

The present invention relates to novel imidazoheterocyclic compounds and pharmaceutically acceptable salt thereof. More particularly, it relates to novel imidazoheterocyclic compounds and pharmaceutically acceptable salts thereof which have antiulcerative activity, to processes for preparation thereof, to a pharmaceutical composition comprising the same.

EP-A-0 033 094 discloses imidazo[1,2-a]pyridines and 2,3-dihydro-, 5,6,7,8-tetrahydro-, 2,3,5,6,7,8-hexahydro-analogues and salts of such compounds. Also the process for preparing the compounds and pharmaceutical compositions containing them are disclosed. It is described that the compounds are 10 antisecretory and cytoprotective agents and are particularly useful in the treatment of ulcer diseases.

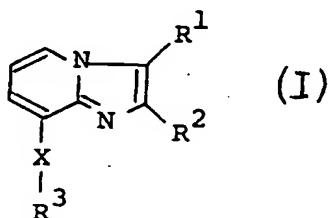
Accordingly, one object of the present invention is to provide novel imidazoheterocyclic compounds and pharmaceutically acceptable salt thereof, which are useful as an antiulcerative agent.

Another object of the present invention is to provide processes for preparation of said imidazoheterocyclic compounds and salts thereof.

15 A further object of the present invention is to provide a pharmaceutical composition comprising, as an active ingredient, said imidazoheterocyclic compound or its pharmaceutically acceptable salt.

Still further object of the present invention is to provide a method of using said imidazoheterocyclic compound or its pharmaceutically acceptable salt in the treatment of ulcer in human or animals.

The imidazoheterocyclic compounds of the present invention are novel and can be represented by the 20 formula (I):



wherein

R<sup>1</sup> is (C<sub>2</sub> - C<sub>6</sub>) alkenyl, (C<sub>2</sub> - C<sub>6</sub>) alkynyl,  
(C<sub>3</sub> - C<sub>6</sub>) alkadienyl,

35 (C<sub>2</sub> - C<sub>6</sub>) alkenyloxy (C<sub>1</sub> - C<sub>6</sub>) alkyl,  
(C<sub>2</sub> - C<sub>6</sub>) alkynyloxy (C<sub>1</sub> - C<sub>6</sub>) alkyl,  
carboxy (C<sub>2</sub> - C<sub>6</sub>) alkynyloxy (C<sub>1</sub> - C<sub>6</sub>) alkyl or

40 (C<sub>1</sub> - C<sub>6</sub>) alkoxy carbonyl (C<sub>2</sub> - C<sub>6</sub>) alkynyloxy (C<sub>1</sub> - C<sub>6</sub>) alkyl;  
hydrogen, (C<sub>1</sub> - C<sub>6</sub>) alkyl or aryl selected from a group consisting of phenyl, tolyl, xylol, 1-naphthyl, 2-naphthyl, 1-anthryl, and 2-anthryl,

45 R<sup>2</sup> is ar (C<sub>1</sub> - C<sub>6</sub>) alkyl which has one or more suitable substituent(s) selected from a group consisting of (C<sub>1</sub> - C<sub>6</sub>)-alkyl and halogen,  
ar (C<sub>2</sub> - C<sub>6</sub>) alkenyl, benzene-condensed cyclo (C<sub>5</sub> - C<sub>6</sub>) alkyl, (C<sub>1</sub> - C<sub>6</sub>) alkyl having cyclo (C<sub>3</sub> - C<sub>6</sub>) alkyl or

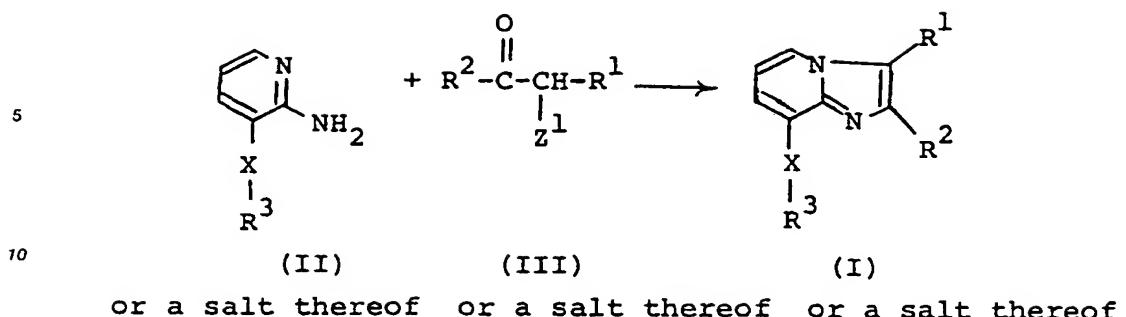
(C<sub>1</sub> - C<sub>6</sub>) alkyl, and

X is O or NH.

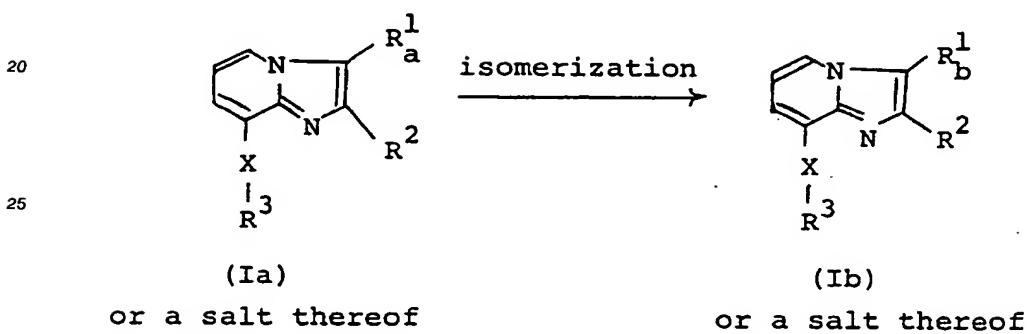
According to the present invention, the object compounds (I) can be prepared by the following processes.

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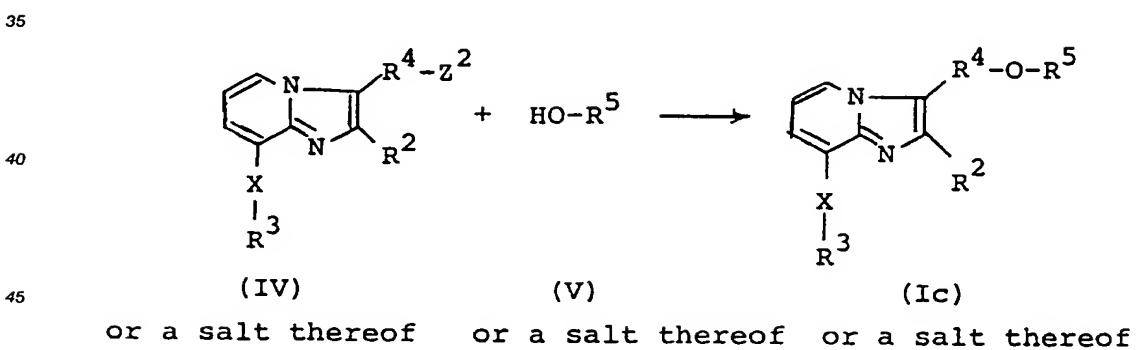
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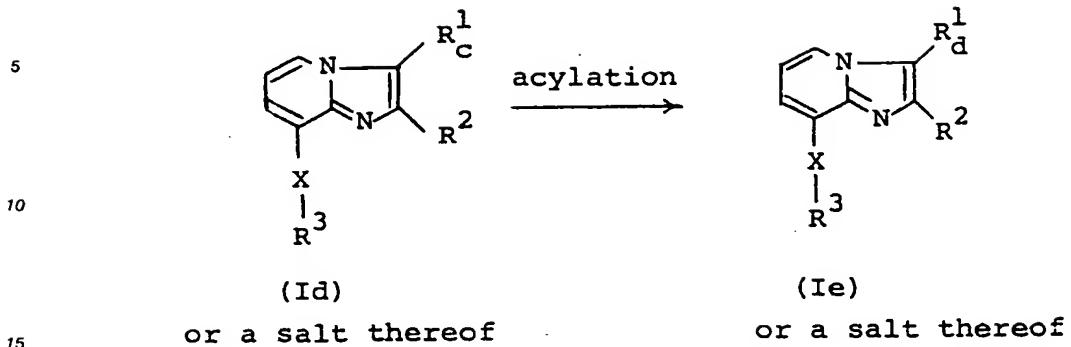
## 15 Process 2



### Process 3



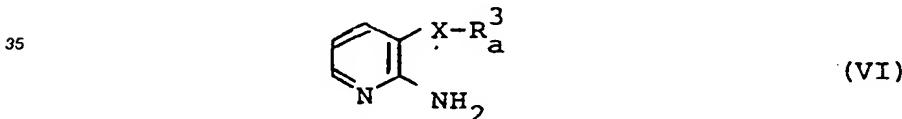
## Process 4



wherein

|                                     |  |
|-------------------------------------|--|
| $R^1$ , $R^2$ , $R^3$ , $X$ and $Y$ | are each as defined above,   |
| $R_a^1$ is                          | ( $C_2$ - $C_6$ ) alkynyl,   |
| $R_b^1$ is                          | cumulated ( $C_3$ - $C_6$ ) alkadienyl,  |
| $R_c^1$ is                          | ( $\omega$ -( $C_2$ - $C_6$ ) alkynyoxy) ( $C_1$ - $C_6$ ) alkyl,  |
| $R_d^1$ is                          | ( $\omega$ -carboxy- $\omega$ -( $C_2$ - $C_6$ ) alkynyoxy) ( $C_1$ - $C_6$ ) alkyl or<br>( $\omega$ -( $C_1$ - $C_6$ ) alkoxy carbonyl- $\omega$ -( $C_2$ - $C_6$ ) alkynyoxy)-( $C_1$ - $C_6$ ) alkyl, |
| $R^4$ is                            | ( $C_1$ - $C_6$ ) alkylene,  |
| $R^5$ is                            | ( $C_2$ - $C_6$ ) alkenyl, ( $C_2$ - $C_6$ ) alkynyl,<br>carboxy ( $C_2$ - $C_6$ ) alkynyl or<br>( $C_1$ - $C_6$ ) alkoxy carbonyl ( $C_2$ - $C_6$ ) alkynyl,  |
| $Z^1$ is                            | an acid residue selected from a group consisting of halogen and acyloxy, and   |
| $Z^2$ is                            | a leaving group.   |

30 As to the starting compounds (II), (III) and (IV), some of them are novel and can be prepared by the procedures disclosed in the Preparations as mentioned later.  
 Especially, some of said novel starting compound (II) can be represented by the following general formula:



40 wherein

$R_a^3$  is  $(C_1 - C_6)$  alkyl having cyclo  $(C_3 - C_6)$  alkyl or ar  $(C_1 - C_6)$  alkyl which has one or more suitable substituent(s) selected from the group consisting of  $(C_1 - C_6)$  alkyl and halogen, X is O or NH.

45 Suitable pharmaceutically acceptable salts of the object compounds (I) are conventional non-toxic salts  
and include a salt with a base or an acid addition salt such as a salt with an inorganic base, for example, an  
alkali metal salt (e.g. sodium salt or potassium salt), an alkaline earth metal salt (e.g. calcium salt or  
magnesium salt), an ammonium salt; a salt with an organic base, for example, or an organic amine salt (e.g.  
triethylamine salt, pyridine salt, picoline salt, ethanolamine salt, triethanolamine salt, dicyclohexylamine salt,  
or N,N'-dibenzylethylenediaminesalt); an organic acid addition salt (e.g. acetate, maleate, tartrate,  
50 methanesulfonate, benzenesulfonate, formate, or toluenesulfonate), an inorganic acid addition salt (e.g.  
hydrochloride, hydrobromide, sulfate, or phosphate), or a salt with an amino acid (e.g. arginine, aspartic  
acid, glutamic acid).

In the above and subsequent descriptions of the present specification, suitable examples and illustrations of the various definitions which the present invention includes within the scope thereof are explained in detail as follows.

Suitable (C<sub>1</sub> - C<sub>6</sub>) alkyl may include methyl, ethyl, propyl, isopropyl, n-butyl, t-butyl, pentyl or hexyl, in which the preferred one may be C<sub>1</sub>-C<sub>4</sub>alkyl and the more preferred one may be methyl and ethyl.

### Suitable (C<sub>2</sub>-C<sub>6</sub>) alkenyl"

may include vinyl, allyl, isopropenyl, 1(or 2 or 3)-butenyl, 1(or 2 or 3 or 4)-pentenyl, or 1(or 2 or 3 or 4 or 5)-hexenyl, in which the preferred one may be C<sub>2</sub>-C<sub>4</sub>alkenyl and the more preferred one may be allyl.

Suitable (C<sub>2</sub>-C<sub>6</sub>) alkynyl"

5 may include ethynyl, 1(or 2)-propynyl, 1(or 2 or 3)-butynyl, 1-methyl-2-propynyl, 1(or 2 or 3 or 4)-pentynyl, or 1(or 2 or 3 or 4 or 5)-hexynyl, in which the preferred one may be C<sub>2</sub>-C<sub>4</sub>alkynyl and the more preferred one may be 2-propynyl.

Suitable (C<sub>3</sub>-C<sub>6</sub>) alkadienyl"

10 may include 1,2-propadienyl, 1,2-butadienyl, 1,3-butadienyl, 2,3-pentadienyl, 1,4-pentadienyl, 1,2-hexadienyl, 1,3-hexadienyl, or 1,4-hexadienyl,

10 in which the preferred one may be C<sub>3</sub>-C<sub>5</sub> alkadienyl and the more preferred one may be 1,2-propadienyl.

15 "Cumulated (C<sub>3</sub>-C<sub>6</sub>) alkadienyl" means the above-defined (C<sub>3</sub>-C<sub>6</sub>) alkadienyl" group in which two double bonds are adjacent to each other through one carbon atom, and suitable examples of such "cumulated (C<sub>3</sub>-C<sub>6</sub>)-alkadienyl" may include 1,2-propadienyl, 1,2-butadienyl, 2,3-pentadienyl, or 1,2-hexadienyl,

15 in which the preferred one may be cumulated C<sub>3</sub>-C<sub>5</sub>alkadienyl and the more preferred one may be 1,2-propadienyl.

20 In the term (C<sub>2</sub>-C<sub>6</sub>) alkenyloxy (C<sub>1</sub>-C<sub>6</sub>) alkyl", suitable (C<sub>2</sub>-C<sub>6</sub>) alkenyl" moiety and (C<sub>1</sub>-C<sub>6</sub>) alkyl" moiety can be referred to the ones as mentioned above, respectively, and suitable examples of such "(C<sub>2</sub>-C<sub>6</sub>) alkenyloxy (C<sub>1</sub>-C<sub>6</sub>)alkyl" may include vinyloxyethyl, allyloxyethyl, 1-allyloxyethyl, 1-allyloxypropyl, 3-allyloxybutyl, 3-(2-butenyloxy)butyl, 5-(3-pentenyloxy)pentyl, or 1-(2-hexenyloxy)hexyl, in which the preferred one may be (C<sub>2</sub>-C<sub>4</sub>)alkenyloxy(C<sub>1</sub>-C<sub>4</sub>)alkyl and the more preferred one may be allyloxyethyl.

25 In the term (C<sub>2</sub>-C<sub>6</sub>) alkynyoxy (C<sub>1</sub>-C<sub>6</sub>) alkyl", suitable (C<sub>2</sub>-C<sub>6</sub>) alkynyl" moiety and (C<sub>1</sub>-C<sub>6</sub>) alkyl" moiety can be referred to the ones as mentioned above, respectively, and suitable examples of such (C<sub>2</sub>-C<sub>6</sub>) alkynyoxy (C<sub>1</sub>-C<sub>6</sub>)alkyl" may include ethynyoxyethyl, 2-propynyoxyethyl, 2-(2-propynyoxy)ethyl, 1-(2-butynyloxy)propyl, 1-(3-butynyloxy)propyl, 2-(3-butynyloxy)butyl, 3-(3-butynyloxy)butyl, 4-(1-pentyloxy), 4-(4-pentyloxy)pentyl, 5-(5-hexynyloxy)hexyl, or 6-(5-hexynyloxy)hexyl,

30 in which the preferred one may be (C<sub>2</sub>-C<sub>4</sub>)alkynyoxy(C<sub>1</sub>-C<sub>4</sub>)alkyl and the more preferred one may be 2-propynyoxyethyl.

30 "Carboxy (C<sub>2</sub>-C<sub>6</sub>) alkynyoxy (C<sub>1</sub>-C<sub>6</sub>) alkyl" means the above-defined (C<sub>2</sub>-C<sub>6</sub>) alkynyoxy (C<sub>1</sub>-C<sub>6</sub>) alkyl group which is substituted with carboxy, and suitable examples of such "carboxy (C<sub>2</sub>-C<sub>6</sub>) alkynyoxy (C<sub>1</sub>-C<sub>6</sub>) alkyl" may include carboxyethynyoxyethyl, 3-carboxy-2-propynyoxyethyl, 1-carboxy-2-propynyoxyethyl, 2-(3-carboxy-2-propynyoxy)ethyl, 1-(1-carboxy-2-butynyloxy)propyl, 1-(4-carboxy-3-butynyloxy)-propyl, 2-(4-carboxy-3-butynyloxy)butyl, 3-(4-carboxy-3-butynyloxy)butyl, 4-(3-carboxy-1-pentyloxy)pentyl, 4-(5-carboxy-4-pentyloxy)pentyl, 5-(1-carboxy-5-hexynyloxy)hexyl, or 6-(6-carboxy-5-hexynyloxy)hexyl, in which the preferred one may be carboxy(C<sub>2</sub>-C<sub>4</sub>)alkynyoxy(C<sub>1</sub>-C<sub>4</sub>)alkyl and the more preferred one may be 3-carboxy-2-propynyoxyethyl.

35 Suitable examples of (C<sub>1</sub>-C<sub>6</sub>) alkoxy carbonyl (C<sub>2</sub>-C<sub>6</sub>) alkynyoxy (C<sub>1</sub>-C<sub>6</sub>)alkyl may be methoxycarbonylethynyoxyethyl, 3-ethoxycarbonyl-2-propynyoxyethyl, 1-ethoxycarbonyl-2-propynyoxyethyl, 2-(3-ethoxycarbonyl-2-propynyoxy)ethyl, 1-(1-propoxycarbonyl-2-butynyloxy)propyl, 1-(4-ethoxycarbonyl-3-butynyloxy)propyl, 2-(4-butoxycarbonyl-3-butynyloxy)butyl, 3-(4-tert-butoxycarbonyl-3-butynyloxy)butyl, 4-(3-pentyloxy carbonyl-1-pentyloxy)pentyl, 4-(5-ethoxycarbonyl-4-pentyloxy)pentyl, 5-(1-hexyloxy carbonyl-5-hexynyloxy)hexyl, or 6-(6-hexyloxy carbonyl-5-hexynyloxy)hexyl, in which the preferred one may be (C<sub>1</sub>-C<sub>4</sub>)alkoxycarbonyl(C<sub>2</sub>-C<sub>4</sub>)alkynyoxy(C<sub>1</sub>-C<sub>4</sub>)alkyl and the more preferred one may be 3-ethoxycarbonyl-2-propynyoxyethyl.

40 Suitable "carboxy (C<sub>2</sub>-C<sub>6</sub>) alkynyl" may be the same as that in the terms of "carboxy (C<sub>2</sub>-C<sub>6</sub>))-alkynyoxy (C<sub>1</sub>-C<sub>6</sub>))-alkyl" and may include carboxyethynyl, 3-carboxy-2-propynyl, 1-carboxy-2-propynyl, 1-carboxy-2-butynyl, 4-carboxy-3-butynyl, 3-carboxy-1-pentyloxy, 1-carboxy-5-hexynyl, or 6-carboxy-5-hexynyl, in which the preferred one may be carboxy(C<sub>2</sub>-C<sub>4</sub>)alkynyl and the more preferred one may be 3-carboxy-2-propynyl.

45 Suitable (C<sub>1</sub>-C<sub>6</sub>) alkoxy carbonyl (C<sub>2</sub>-C<sub>6</sub>))alkynyl may include methoxycarbonylethynyl, 3-ethoxycarbonyl-2-propynyl, 1-ethoxycarbonyl-2-propynyl, 1-propoxycarbonyl-2-butynyl, 4-ethoxycarbonyl-3-butynyl, 4-butoxycarbonyl-3-butynyl, 4-tert-butoxycarbonyl-3-butynyl, 3-pentyloxy carbonyl-1-pentyloxy, 1-hexyloxy carbonyl-5-hexynyl, or 6-hexyloxy carbonyl-5-hexynyl, in which the preferred one may be (C<sub>1</sub>-C<sub>4</sub>)-alkoxycarbonyl(C<sub>2</sub>-C<sub>4</sub>)alkynyl and the more preferred one may be 3-ethoxycarbonyl-2-propynyl.

55 "(ω-(C<sub>2</sub>-C<sub>6</sub>)Alkynyoxy)(C<sub>1</sub>-C<sub>6</sub>))alkyl" means the above-defined lower alkynyoxy(C<sub>1</sub>-C<sub>6</sub>))alkyl group, in which the triple bond always exists on the terminal carbon atom of the (C<sub>2</sub>-C<sub>6</sub>) alkynyl moiety, and suitable examples of such "(ω-(C<sub>2</sub>-C<sub>6</sub>)alkynyoxy) (C<sub>1</sub>-C<sub>6</sub>) alkyl" may include ethynyoxyethyl, 2-propynyoxy-

ymethyl, 2-(2-propynylloxy)ethyl, 1-(3-butynylloxy)propyl, 2-(3-butynylloxy)butyl, 4-(4-pentynylloxy)pentyl, or 6-(5-hexynylloxy)hexyl, in which the preferred one may be  $[\omega\text{-}(\text{C}_2\text{-}\text{C}_4)\text{alkynyl}\text{O}]\text{(C}_1\text{-}\text{C}_4\text{)}\text{alkyl}$  and the more preferred one may be 2-propynylmethoxymethyl.

" $(\omega\text{-Carboxy-}\omega\text{-}(\text{C}_2\text{-}\text{C}_6)\text{alkynyl}\text{O})(\text{C}_1\text{-}\text{C}_6)\text{ alkyl}$ " means the above-defined  $\omega\text{-}(\text{C}_2\text{-}\text{C}_6)\text{alkynyl}\text{O}(\text{C}_1\text{-}\text{C}_6)$

5 alkyl group which is substituted with carboxy on the terminal carbon atom of the  $(\text{C}_2\text{-}\text{C}_6)$  alkynyl moiety, and suitable examples of such " $(\omega\text{-Carboxy-}\omega\text{-}(\text{C}_2\text{-}\text{C}_6)\text{alkynyl}\text{O})(\text{C}_1\text{-}\text{C}_6)\text{ alkyl}$ " may include carboxyethynylmethoxymethyl, 3-carboxy-2-propynylmethoxymethyl, 2-(3-carboxy-2-propynylloxy)ethyl, 1-(4-carboxy-3-butynylloxy)propyl, 2-(4-carboxy-3-butynylloxy)butyl, 4-(5-carboxy-4-pentynylloxy)pentyl, or 6-(6-carboxy-5-hexynylloxy)hexyl, in which the preferred one may be  $[\omega\text{-Carboxy-}\omega\text{-}(\text{C}_2\text{-}\text{C}_4)\text{alkynyl}\text{O}]\text{(C}_1\text{-}\text{C}_4\text{)}\text{alkyl}$  and the

10 more preferred one may be 3-carboxy-2-propynylmethoxymethyl.

" $(\omega\text{-}(\text{C}_1\text{-}\text{C}_6)\text{Alkoxy carbonyl-}\omega\text{-}(\text{C}_2\text{-}\text{C}_6)\text{ alkynyl}\text{O})(\text{C}_1\text{-}\text{C}_6)\text{-alkyl}$ " means the above-defined  $\omega\text{-}(\text{C}_1\text{-}\text{C}_6)\text{-alkoxy carbonyl}$  ( $\text{C}_1\text{-}\text{C}_6$ )-alkyl-group which is substituted with  $(\text{C}_1\text{-}\text{C}_6)\text{Alkoxy carbonyl}$  as mentioned above on the terminal carbon atom of the  $(\text{C}_2\text{-}\text{C}_6)$  alkynyl moiety, and suitable examples of such  $(\omega\text{-}(\text{C}_1\text{-}\text{C}_6)\text{-alkoxy carbonyl-}\omega\text{-}(\text{C}_2\text{-}\text{C}_6)\text{ alkynyl}\text{O})(\text{C}_1\text{-}\text{C}_6)\text{-alkyl}$  may be such as methoxycarbonyl ethynylmethoxymethyl, 3-ethoxycarbonyl-2-propynylmethoxymethyl, 2-(3-ethoxycarbonyl-2-propynylloxy)ethyl, 1-(4-propoxycarbonyl-3-butynylloxy)propyl, 3-(4-tert-butoxycarbonyl-3-butynylloxy)butyl, 4-(5-pentylloxycarbonyl-4-pentynylloxy)pentyl, or 5-(6-hexyloxycarbonyl-5-hexynylloxy)hexyl, in which the preferred one may be  $[\omega\text{-}(\text{C}_1\text{-}\text{C}_4)\text{-Alkoxy carbonyl-}\omega\text{-}(\text{C}_2\text{-}\text{C}_4)\text{ alkynyl}\text{O}]\text{(C}_1\text{-}\text{C}_4\text{)}\text{-alkyl}$  and the more preferred one may be 3-ethoxycarbonyl-2-propynylmethoxymethyl.

20 Suitable "aryl" may include phenyl, tolyl, xylyl, 1-naphthyl, 2-naphthyl, 1-anthryl, or 2-anthryl, in which the preferred one may be phenyl.

Suitable "ar ( $\text{C}_1\text{-}\text{C}_6$ ) alkyl" may include mono-(or di- or tri-)phenyl ( $\text{C}_1\text{-}\text{C}_6$ )alkyl such as benzyl, 1-phenylethyl, 2-phenylethyl, 2-phenylpropyl, 3-phenylbutyl, 1-methyl-2-phenylpropyl, 5-phenylpentyl, 4-phenylhexyl, benzhydryl, 2,3-diphenylpropyl, trityl, or 1,2,3-triphenylbutyl or naphthyl ( $\text{C}_1\text{-}\text{C}_6$ ) alkyl such as 25 1-naphthylmethyl, 2-naphthylmethyl, 1-(2-naphthyl)ethyl, 3-(1-naphthyl)propyl, 2-(2-naphthyl)butyl, 5-(1-naphthyl)pentyl, or 4-(2-naphthyl)hexyl ;

in which the preferred one may be phenyl( $\text{C}_1\text{-}\text{C}_4$ )alkyl and naphthyl( $\text{C}_1\text{-}\text{C}_4$ )alkyl, and the more preferred one may be benzyl, 1-phenylethyl, 2-phenylethyl, 1-naphthylmethyl and 2-naphthylmethyl.

Said "ar ( $\text{C}_1\text{-}\text{C}_6$ )alkyl" may have one or more (preferably 1 to 3) suitable substituent(s) selected from a 30 group consisting of ( $\text{C}_1\text{-}\text{C}_6$ ) alkyl (e.g. methyl, ethyl, propyl, isopropyl, butyl, pentyl, or hexyl) and halogen (e.g. fluoro, chloro, bromo, iodo), and the preferred examples of said substituted ar( $\text{C}_1\text{-}\text{C}_6$ )alkyl may be mono or di halophenyl(lower)alkyl (e.g. 2-chlorobenzyl, 3-chlorobenzyl, 4-chlorobenzyl, 2-bromobenzyl, 4-bromobenzyl, 2-fluorobenzyl, 4-fluorobenzyl, 4-iodobenzyl, 2-chlorophenethyl, 2,3-dichlorobenzyl, 2,4-dichlorobenzyl, 3,4-dichlorobenzyl, 2,6-dichlorobenzyl, 2-chloro-4-fluorobenzyl, mono or di ( $\text{C}_1\text{-}\text{C}_6$ ) alkylphenyl ( $\text{C}_1\text{-}\text{C}_6$ ) alkyl (e.g. 2-methylbenzyl, 3-methylbenzyl, 4-methylbenzyl, 2-methylphenethyl, 2-ethylbenzyl, 2-propylbenzyl, 2-isopropylbenzyl, 3-butylbenzyl, 4-pentylbenzyl, 2-hexylbenzyl, 2,3-dimethylbenzyl, 2,6-dimethylbenzyl, 2,4-diethylbenzyl, or 2-methyl-4-propylbenzyl , and the more preferred one may be mono or dihalophenyl( $\text{C}_1\text{-}\text{C}_4$ )alkyl and mono or di( $\text{C}_1\text{-}\text{C}_4$ )alkyl phenyl( $\text{C}_1\text{-}\text{C}_4$ )alkyl, and the most preferred one may be 2-chlorobenzyl, 3-chlorobenzyl, 2-bromobenzyl, 2-fluorobenzyl, 2,4-dichlorobenzyl, 3,4-dichlorobenzyl, 40 2,6-dichlorobenzyl, 2-methylbenzyl, 2-ethylbenzyl, 2-isopropylbenzyl and 2,6-dimethylbenzyl.

Suitable "ar ( $\text{C}_2\text{-}\text{C}_6$ ) alkenyl" may include mono (or di or tri)-phenyl( $\text{C}_2\text{-}\text{C}_6$ ) alkenyl such as styryl, cinnamyl, phenylbutenyl (e.g. 4-phenyl-2-butenyl, or 2-phenyl-3-butenyl, phenylpentenyl (e.g. 1-phenyl-1-pentenyl, phenylhexenyl (e.g. 4-phenyl-2-hexenyl, 2,3-diphenyl-1-butenyl, or 2,3,4-triphenyl-4-pentenyl, in which the preferred one may be phenyl( $\text{C}_2\text{-}\text{C}_4$ )alkenyl and the more preferred one may be cinnamyl.

45 Suitable "benzene-condensed cyclo ( $\text{C}_5\text{-}\text{C}_6$ )alkyl" may include naphthyl, 1,4-dihydronaphthyl, indenyl, benzene-condensed cyclo ( $\text{C}_5\text{-}\text{C}_6$ ) alkyl (e.g. 1,2,3,4-tetrahydronaphthyl, 2,3-dihydroindenyl, or perhydroindenyl in which the preferred one may be benzene-condensed cyclo( $\text{C}_5\text{-}\text{C}_6$ )alkyl and the more preferred one may be 1,2,3,4-tetrahydronaphthyl.

Suitable "( $\text{C}_1\text{-}\text{C}_6$ )alkyl having cyclo ( $\text{C}_3\text{-}\text{C}_6$ )alkyl" may include cyclopropylmethyl, cyclobutylmethyl, 50 cyclopentylethyl, cyclohexylmethyl, cyclohexylethyl, cyclohexylpropyl, cyclohexylbutyl, cyclohexylpentyl, or cyclohexylhexyl, in which the preferred one may be cyclo( $\text{C}_5\text{-}\text{C}_6$ )alkyl( $\text{C}_1\text{-}\text{C}_4$ )alkyl and the more preferred one may be cyclohexylmethyl.

Suitable "( $\text{C}_1\text{-}\text{C}_6$ )alkylene" may include methylene, ethylene, trimethylene, propylene, tetramethylene, pentamethylene, or hexamethylene in which the preferred one may be  $\text{C}_1\text{-}\text{C}_4$ alkylene and the more 55 preferred one may be methylene.

Suitable "an acid residue" may include halogen (e.g. fluorine, chlorine, bromine, iodine), or acyloxy (e.g. acetoxy, tosyloxy, mesyloxy, etc.).

Suitable "a leaving group" may include an acid residue as mentioned above, a group of the formula:



wherein

10 R<sup>6</sup>, R<sup>7</sup> and R<sup>8</sup> are each (C<sub>1</sub>-C<sub>6</sub>) alkyl as mentioned above, and  
Z<sup>3</sup> is an acid residue as mentioned above.

The processes for preparing the object compounds of the present invention are explained in detail in the following.

15 Process 1

The object compound (I) or a salt thereof can be prepared by reacting the compound (II) or a salt thereof with the compound (III) or a salt thereof.

Suitable salts of the compound (II) can be referred to the acid addition salt as exemplified for the compound (I) and those of the compound (III) can be referred to the salt with a base for the same.

This reaction is usually carried out in a solvent such as alcohol [e.g. methanol, or ethanol, benzene, N,N-dimethylformamide, tetrahydrofuran, diethyl ether or any other solvent which does not adversely affect the reaction.

The reaction may be carried out in the presence of an inorganic or an organic base such as an alkali metal hydroxide [e.g. sodium hydroxide, or potassium hydroxide], an alkali metal carbonate [e.g. sodium carbonate, or potassium carbonate], an alkali metal bicarbonate [e.g. sodium bicarbonate, or potassium bicarbonate], tri (C<sub>1</sub>-C<sub>6</sub>)alkylamine [e.g. trimethylamine, or triethylamine], pyridine or its derivative [e.g. picoline, lutidine, or 4-dimethylaminopyridine]. In case that the base to be used is liquid, it can also be used as a solvent.

30 The reaction temperature is not critical, and the reaction can be carried out under cooling, at ambient temperature or under warming or heating.

Process 2

35 The object compound (Ib) or a salt thereof can be prepared by subjecting the compound (Ia) or a salt thereof to isomerization reaction of (C<sub>2</sub>-C<sub>6</sub>) alkynyl into cumulated (C<sub>3</sub>-C<sub>6</sub>) alkadienyl.

Suitable salts of the compounds (Ia) and (Ib) can be referred to the acid addition salts as exemplified for the compound (I).

This reaction is usually carried out in the presence of a base such as an alkali metal hydroxide (e.g. sodium hydroxide, or potassium hydroxide, or an alkali metal carbonate (e.g. sodium carbonate, potassium carbonate).

This reaction is usually carried out in a solvent such as alcohol (e.g. methanol, or ethanol), N,N-dimethylformamide or any other solvent which does not adversely affect the reaction.

45 The reaction temperature is not critical, and the reaction can be carried out at ambient temperature or under warming or heating.

Process 3

50 The object compound (Ic) or a salt thereof can be prepared by reacting the compound (IV) or a salt thereof with the compound (V) or a salt thereof.

Suitable salts of the compound (IV) can be referred to the acid addition salts as exemplified for the object compound (I).

Suitable salts of the compound (Ic) can be referred to the ones as exemplified for the object compound (I).

55 Suitable salts of the compound (V) are salts with a base such as an alkali metal salt (e.g. sodium salt, potassium salt, or lithium salt).

This reaction is usually carried out in the presence of a base such as alkali metal hydride (e.g. sodium hydride, potassium hydride, or lithium hydride), alkali metal alkoxide (e.g. potassium t-butoxide or an alkali

metal (e.g. sodium, or potassium, lithium ).

This reaction is usually carried out in a solvent such as alcohol [e.g. methanol, or ethanol], dimethyl sulfoxide, benzene, N,N-dimethylformamide, tetrahydrofuran, diethyl ether or any other solvent which does not adversely affect the reaction.

5 In case that the compound (V) or a salt thereof to be used is liquid, it can also be used as a solvent.  
The reaction temperature is not critical, and the reaction can be carried out under cooling, at ambient temperature or under warming or heating.

Process 4

10 The object compound (Ie) or a salt thereof can be prepared by subjecting the compound (Id) or a salt thereof to acylation reaction.

Suitable salts of the compound (Id) can be referred to the acid addition salts as exemplified for the compound (I).

15 Suitable salts of the compound (Ie) can be referred to the ones as exemplified for the compound (I).  
The acylation reaction of this process can be carried out by reacting the compound (Id) or a salt thereof with a conventional agent which can introduce a carboxy or a protected carboxy group into a terminal carbon atom of (C<sub>2</sub>-C<sub>6</sub>) alkynyl such as carbon dioxide gas, dry ice, (C<sub>1</sub>-C<sub>6</sub>)alkoxy(halo)formate (e.g. ethyl chloroformate, di(C<sub>1</sub>-C<sub>6</sub>)alkyl carbonate (e.g. dimethyl carbonate, or diethyl carbonate), di(C<sub>1</sub>-C<sub>6</sub>)alkyl oxalate (e.g. diethyl oxalate) or tri (C<sub>1</sub>-C<sub>6</sub>) alkyl phosphonoacetate (e.g. triethyl phosphonoacetate ).

20 This reaction is usually carried out in the presence of a base such as metalated (C<sub>1</sub>-C<sub>6</sub>) alkyl (e.g. methyl lithium, or n-butyl lithium, metalated aryl (e.g. phenyl lithium), or alkali metal hydride (e.g. sodium hydride, or potassium hydride).

25 This reaction is usually carried out in a solvent such as diethyl ether, tetrahydrofuran, N,N-dimethylformamide, n-hexane or any other solvent which does not adversely affect the reaction.

The reaction temperature is not critical, and the reaction can be carried out under cooling or at ambient temperature.

30 The object compounds (I) and their pharmaceutically acceptable salts of the present invention are novel and exhibit high antiulcerative activity.  
In order to illustrate the usefulness of the object compounds (I), the pharmacological data of some representative compounds of the object compounds (I) are shown in the following.

(A) Inhibition on ethanol ulcer

35 Test Method :

Five male Sprague-Dawley rats, aged 7 weeks and weighing about 200 g, were used per group for the study on ethanol ulcer after the fast for 24 hours.

36 Test compound was suspended in 0.1% methylcellulose aqueous solution, and the suspension (5 ml/kg) was orally given to each rat.

The control group was given a vehicle, i.e. 0.1% methylcellulose aqueous solution (5 ml/kg), alone in the same way.

40 Absolute ethanol (5 ml/kg) was orally administered 30 minutes after dosing with test compound, and one hour later, the rats were sacrificed and their stomachs were removed. The area of ulcers of each rat was measured. The mean area (mm) in the medicated group was compared with that in the control group.

Test compounds

45 (1) 8-(2-Methylbenzyloxy)-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a] pyridine  
(2) 8-(2-Chlorobenzyloxy)-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine  
(3) 8-(2-Methylbenzyloxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine

Test Results

55 A) Inhibition % at the dose of 32 mg/kg :

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| Test Compound | Inhibition % |
|---------------|--------------|
| (1)           | 94.4         |
| (2)           | 98.2         |
| (3)           | 91.8         |

5 B) The ED<sub>50</sub> value of the Test Compound (1) : 1.1 mg/kg

10 (B) Inhibition on stress ulcer

15 Test Method :

15 Five Sprague-Dawley rats weighing about 200 g were used per group. Each animal was immobilized in a small cage and put in a water bath allowing to respire. The temperature of the water bath kept at 22 °C. The test compound was administered orally just before the immobilization. Seven hours later, the animals were sacrificed and their stomachs were removed. The stomach was then fixed with 2% formalin. The area of ulcers was measured for each animal. The mean area (mm<sup>2</sup>) in the medicated animals was compared 20 with that in the control animals.

25 Test Compounds

25 (1) 8-(2-Methylbenzyloxy)-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine  
(2) 8-(2-Chlorobenzyloxy)-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine  
(3) 8-(2-Methylbenzyloxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine

30 Test Results

30 A) Inhibition % at the dose of 32 mg/kg :

| Test Compound | Inhibition % |
|---------------|--------------|
| (1)           | 100          |
| (2)           | 100          |
| (3)           | 100          |

40 B) The ED<sub>50</sub> value of the Test Compound (1) : 0.15 mg/kg

As being apparent from the above test results, the object compound (I) of the present invention are useful as an antiulcerative agent.

45 For therapeutic purpose, the compounds according to the present invention can be used in a form of pharmaceutical preparation containing said compound as an active ingredient, in admixture with a pharmaceutically acceptable carrier such as an organic or inorganic solid or liquid excipient suitable for oral or parenteral administration. The pharmaceutical preparations may be capsules, tablets, dragees, solution, suspension, emulsion, and the like. If desired, there may be included in the above preparations auxiliary substances, stabilizing agents, wetting or emulsifying agents, buffers and other commonly used additives.

50 While the dosage of the compounds will vary depending upon the age and condition of the patient, an average single dose of about 5 mg, 10 mg, 50 mg, 100 mg, 250 mg, 500 mg, and 1000 mg of the compounds according to the present invention may be effective for treating ulcer. In general, amounts between 1 mg/body and about 2,000 mg/body or even more may be administered per day.

55 The following preparations and examples are given for the purpose of illustrating the present invention.

Preparation 1

A solution of 5-hexen-2-one (3.92 g) in N,N-dimethylformamide (4 ml) was added to mixture of cupric

chloride dihydrate (13.636 g) and lithium chloride (3.392 g) in N,N-dimethylformamide (20 ml) at 80 °C. After being stirred at 80-90 °C for 1 hour, the mixture was poured into cold water and extracted with ethyl acetate. The extract was washed with water, dried over magnesium sulfate and evaporated in vacuo to give a crude oil of 3-chloro-5-hexen-2-one (3.01 g) which was used for the next step without purification.

5

#### Preparation 2

Tosyl chloride (3.81 g) was added to a solution of 3-hydroxy-5-hexyn-2-one (2.24 g) and triethylamine (2.424 g) in methylene chloride (20 ml) under ice-cooling. After being stirred for 2.5 hours, the mixture was washed with water, dried over magnesium sulfate and evaporated in vacuo. The oily residue was purified by column chromatography on silica gel (60 g) using methylene chloride as an eluent to give an oil of 3-tosyloxy-5-hexyn-2-one (2.94 g).

10

IR (film/NaCl) : 3280, 1720, 1590, 1360 (broad)  $\text{cm}^{-1}$

NMR ( $\text{CCl}_4$ ,  $\delta$ ) : 1.79 (1H, t,  $J=2\text{Hz}$ ), 2.25 (3H, s), 2.43 (3H, s), 2.3-2.6 (2H, m), 4.66 (1H, t,  $J=5\text{Hz}$ ), 7.31 (2H, d,  $J=8\text{Hz}$ ), 7.78 (2H, d,  $J=8\text{Hz}$ ).

15

#### Preparation 3

20

Mesyl chloride (1.73 ml) was added dropwise to a solution of 3-hydroxy-2-methoxy-1-hexen-5-yne (2 g) and triethylamine (3.32 ml) in methylene chloride (20 ml) under ice-cooling over a period of 10 minutes. After being stirred for 48 hours at room temperature the mixture was washed successively with water, aqueous sodium bicarbonate solution, and brine, dried over magnesium sulfate, and evaporated in vacuo to give 3-mesyloxy-2-methoxy-1-hexen-5-yne (3.45 g).

IR (film/NaCl) : 3280, 2110  $\text{cm}^{-1}$

25

NMR ( $\text{CCl}_4$ ,  $\delta$ ) : 1.96 (1H, t,  $J=3\text{Hz}$ ), 2.63-2.80 (2H, m), 2.95 (3H, s), 3.62 (3H, s), 4.22 (1H, d,  $J=3\text{Hz}$ ), 4.40 (1H, d,  $J=3\text{Hz}$ ), 4.93 (1H, t,  $J=6\text{Hz}$ )

#### Preparation 4

30

To a solution of 3-mesyloxy-2-methoxy-1-hexen-5-yne (0.5 g) in acetone (1.5 ml) was added 20% sulfuric acid (1.5 ml) under ice-cooling and the mixture was stirred for 1.5 hours under the same conditions and then for 1.5 hours at room temperature. Acetone was evaporated in vacuo and the residue was extracted with methylene chloride. The extract was washed successively with water, aqueous sodium bicarbonate solution, and brine, dried over magnesium sulfate, and evaporated in vacuo to give 3-mesyloxy-5-hexyn-2-one (0.41 g).

IR (film/NaCl) : 3290, 2120, 1720  $\text{cm}^{-1}$

NMR ( $\text{CCl}_4$ ,  $\delta$ ) : 2.03 (1H, t,  $J=3\text{Hz}$ ), 2.31 (3H, s) 2.70-2.86 (2H, m), 3.11 (3H, s), 4.92 (1H, t,  $J=6\text{Hz}$ )

#### Preparation 5

40

To a mixture of 2-amino-3-hydroxypyridine (7 g) and Adogen 464 (Trademark : prepared by Aldrich Chemical Co.) (0.4 g) in 40% aqueous sodium hydroxide (32 ml) and methylene chloride (32 ml) was added 2-methylbenzyl chloride (8.42 ml) at ambient temperature. After being stirred for 24 hours, the organic layer was separated and the aqueous layer was extracted with methylene chloride. The combined extracts were washed with saturated sodium chloride aqueous solution, dried over magnesium sulfate, and evaporated in vacuo. The crystalline residue was recrystallized from ethyl acetate to give 2-amino-3-(2-methylbenzyloxy)-pyridine (7.56 g).

mp : 100 to 101 °C

IR (Nujol) : 3450, 3275, 3125, 1625  $\text{cm}^{-1}$

50

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 2.40 (3H, s), 4.68 (2H, s), 5.05 (2H, s), 6.43-6.73 (1H, m), 6.98 (1H, dd,  $J=2\text{Hz}$  and  $8\text{Hz}$ ), 7.10-7.46 (4H, m), 7.66 (1H, dd,  $J=2\text{Hz}$  and  $5\text{Hz}$ )

#### Preparation 6

55

The following compounds were prepared according to a similar manner to that of Preparation 5.

(1) 2-Amino-3-(2-ethylbenzyloxy)pyridine

mp : 93 to 95 °C (recrystallized from a mixture of ethyl acetate and n-hexane)

IR (Nujol) : 3475, 3275, 3130, 1620  $\text{cm}^{-1}$

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NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.27 (3H, t,  $J=8\text{Hz}$ ), 2.73 (2H, q,  $J=8\text{Hz}$ ), 4.68 (2H, broad s), 5.07 (2H, s), 6.43-6.73 (1H, m), 6.99 (1H, d,  $J=7\text{Hz}$ ), 7.12-7.50 (4H, m), 7.66 (1H, dd,  $J=2\text{Hz}$  and  $5\text{Hz}$ )  
(2) 2-Amino-3-(2-isopropylbenzyloxy)pyridine  
mp : 106 to 107  $^{\circ}\text{C}$  (recrystallized from a mixture of ethyl acetate and n-hexane)  
5 IR (Nujol) : 3450, 3275, 3120, 1620  $\text{cm}^{-1}$   
NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.25 (6H, d,  $J=6\text{Hz}$ ), 2.50-3.45 (1H, m), 4.63 (2H, broad s), 5.05 (2H, s), 6.43-6.75 (1H, m), 7.02 (1H, d,  $J=8\text{Hz}$ ), 7.15-7.48 (4H, m), 7.66 (1H, dd,  $J=2\text{Hz}$  and  $5\text{Hz}$ )  
(3) 2-Amino-3-(2-chlorobenzyloxy)pyridine  
mp : 100 to 101  $^{\circ}\text{C}$  (recrystallized from methylene chloride)  
10 IR (Nujol) : 3465, 3275, 3120, 1620  $\text{cm}^{-1}$   
NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 4.73 (2H, broad s), 5.15 (2H, s), 6.40-6.70 (1H, m), 6.92 (1H, dd,  $J=2\text{Hz}$  and  $8\text{Hz}$ ), 7.10-7.50 (4H, m), 7.65 (1H, dd,  $J=2\text{Hz}$  and  $5\text{Hz}$ )  
(4) 2-Amino-3-(3-chlorobenzyloxy)pyridine  
mp : 87.5 to 89  $^{\circ}\text{C}$  (recrystallized from a mixture of methylene chloride and n-hexane)  
15 IR (Nujol) : 3480, 3275, 3100, 1622  $\text{cm}^{-1}$   
NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 4.88 (2H, broad s), 4.97 (2H, s), 6.40-6.63 (1H, m), 6.89 (1H, d,  $J=8\text{Hz}$ ), 7.27 (3H, s), 7.38 (1H, s), 7.65 (1H, dd,  $J=2\text{Hz}$  and  $5\text{Hz}$ )  
(5) 2-Amino-3-(2-bromobenzyloxy)pyridine  
mp : 107 to 108  $^{\circ}\text{C}$  (recrystallized from ethyl acetate)  
20 IR (Nujol) : 3440, 3270, 3125, 1617  $\text{cm}^{-1}$   
NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 4.80 (2H, broad s), 5.11 (2H, s), 6.46-6.70 (1H, m), 6.94 (1H, dd,  $J=1.5\text{Hz}$  and  $7.5\text{Hz}$ ), 7.06-7.76 (5H, m)  
(6) 2-Amino-3-(2,6-dimethylbenzyloxy)pyridine  
mp : 151 to 155  $^{\circ}\text{C}$  (recrystallized from a mixture of ethyl acetate and n-hexane)  
25 IR (Nujol) : 3470, 3280, 3145, 1620  $\text{cm}^{-1}$   
NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 2.47 (6H, s), 4.68 (2H, broad s), 5.01 (2H, s), 6.48-6.71 (1H, m), 6.97-7.28 (4H, m), 7.68 (1H, dd,  $J=2\text{Hz}$  and  $5\text{Hz}$ )  
(7) 2-Amino-3-(2,6-dichlorobenzyloxy)pyridine  
mp : 146 to 148  $^{\circ}\text{C}$  (recrystallized from methanol)  
30 IR (Nujol) : 3455, 3270, 3125, 1620  $\text{cm}^{-1}$   
NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 4.70 (2H, broad s), 5.28 (2H, s), 6.45-6.73 (1H, m), 7.02-7.53 (4H, m), 7.67 (1H, dd,  $J=2\text{Hz}$  and  $5\text{Hz}$ )  
(8) 2-Amino-3-(2-naphthylmethoxy)pyridine  
mp : 138 to 139  $^{\circ}\text{C}$   
35 NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 4.73 (2H, broad s), 5.22 (2H, s), 6.40-6.70 (1H, m), 6.96 (1H, dd,  $J=2\text{Hz}$  and  $7\text{Hz}$ ), 7.30-8.0 (8H, m)  
(9) 2-Amino-3-(1-naphthylmethoxy)pyridine  
mp : 146 to 148  $^{\circ}\text{C}$  (recrystallized from ethyl acetate)  
40 NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 4.72 (2H, broad s), 5.38 (2H, s), 6.36 (1H, dd,  $J=5\text{Hz}$  and  $8\text{Hz}$ ), 7.02 (1H, d,  $J=8\text{Hz}$ ), 7.30-8.13 (8H, m)  
(10) 2-Amino-3-cinnamyloxy pyridine (trans isomer)  
mp : 127 to 129  $^{\circ}\text{C}$  (recrystallized from a mixture of ethyl acetate and n-hexane)  
IR (Nujol) : 3475, 3275, 3120, 1620  $\text{cm}^{-1}$   
45 NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 4.66 (2H, d,  $J=5\text{Hz}$ ), 4.79 (2H, broad s), 6.14-7.02 (4H, m), 7.20-7.48 (5H, m), 7.66 (1H, dd,  $J=2\text{Hz}$  and  $5\text{Hz}$ )  
(11) 2-Amino-3-(1,2,3,4-tetrahydro-1-naphthoxy)pyridine  
mp : 106.5 to 107  $^{\circ}\text{C}$  (recrystallized from a mixture of ethyl acetate and n-hexane)  
IR (Nujol) : 3475, 3300, 3140, 1626  $\text{cm}^{-1}$   
50 NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.60-2.36 (4H, m), 2.63-3.06 (2H, m), 4.63 (2H, broad s), 5.20-5.46 (2H, m), 6.46-6.75 (1H, m), 6.98-7.50 (5H, m), 7.65 (1H, dd,  $J=1\text{Hz}$  and  $5\text{Hz}$ )  
(12) 2-Amino-3-cyclohexylmethoxy pyridine  
mp : 110 to 112  $^{\circ}\text{C}$   
55 NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.63-2.10 (11H, m), 3.78 (2H, d,  $J=6\text{Hz}$ ), 4.69 (2H, broad s), 6.43-6.73 (1H, m), 6.90 (1H, dd,  $J=2\text{Hz}$  and  $8\text{Hz}$ ), 7.64 (1H, dd,  $J=2\text{Hz}$  and  $5\text{Hz}$ )

Preparation 7

Molecular Sieves (16 g) was added to a solution of 2,3-diaminopyridine (8 g), 2-methylbenzaldehyde

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(8.81 g), and acetic acid (4.2 ml) in methanol (160 ml) and the mixture was stirred for 96 hours at room temperature. Sodium cyanoborohydride (4.61 g) was added portionwise to the mixture with stirring under ice-cooling over a period of 20 minutes. After being stirred for 3 hours, the mixture was made alkaline with aqueous sodium bicarbonate solution and filtered by suction. The filtrate was evaporated in vacuo, and to

5 the residue was added water and then extracted with methylene chloride. The extract was washed with brine, dried over magnesium sulfate, and evaporated in vacuo. The crystalline residue was recrystallized from a mixture of ethyl acetate and n-hexane to give 2-amino-3-(2-methylbenzylamino)pyridine (5.38 g).

mp : 135 to 140 °C

10 NMR (CDCl<sub>3</sub>, δ) : 2.36 (3H, s), 3.20-3.63 (1H, broad s), 4.20 (2H, broad d, J = 4Hz), 4.40-5.20 (2H, broad s), 6.50-6.93 (2H, m), 7.0-7.63 (5H, m)

Preparation 8

2-Amino-3-(2-chlorobenzylamino)pyridine was obtained according to a similar manner to that of Preparation 7.

15 mp : 144 to 147 °C

NMR (CDCl<sub>3</sub>, δ) : 3.60-4.60 (3H, m), 4.36 (2H, d, J = 6Hz), 6.43-6.83 (2H, m), 6.96-7.86 (5H, m)

Preparation 9

20 To a solution of 2-methylbenzyl alcohol (0.985 g) in N,N-dimethylformamide (10 ml) was added 62.8% sodium hydride (0.308 g) under a nitrogen atmosphere and then stirred for 30 minutes. 2-Amino-3-chloropyrazine (0.87 g) was added to the solution and the mixture was heated at 65 °C for 2 hours and poured onto crushed ice. The resulting precipitates were collected by filtration, washed with n-hexane, and dried in a desiccator to give 2-amino-3-(2-methylbenzyloxy)pyrazine (0.6 g).

25 mp : 70 to 72 °C

NMR (CDCl<sub>3</sub>, δ) : 2.37 (3H, s), 4.40-5.00 (2H, broad s), 5.34 (2H, s), 7.00-7.45 (4H, m), 7.35 (1H, d, J = 3Hz), 7.48 (1H, d, J = 3Hz)

30 Preparation 10

35 A mixture of 2-amino-3-chloropyrazine (4.3 g), 2-methylbenzylamine (4.6 g), potassium carbonate (5.5 g), and potassium iodide (0.4 g) in N,N-dimethylformamide (43 ml) was refluxed for 24 hours under a nitrogen atmosphere and allowed to stand at room temperature. The mixture was poured into water and extracted with ethyl acetate. The extract was washed with water, dried over magnesium sulfate, and evaporated in vacuo. The residue was purified by column chromatography on silica gel (110 g) with a mixture of chloroform and methanol (100:3) as an eluent to give 2-amino-3-(2-methylbenzylamino)pyrazine (1.4 g).

40 NMR (CDCl<sub>3</sub>, δ) : 2.33 (3H, s), 3.80-4.50 (3H, broad s), 4.50 (2H, d, J = 5Hz), 6.95-7.35 (4H, m), 7.30 (1H, d, J = 3Hz), 7.50 (1H, d, J = 3Hz)

Preparation 11

45 A 60% dispersion of sodium hydride in mineral oil (1.87 g) was added portionwise to a suspension of 8-hydroxy-2-methylimidazo[1,2-a]pyridine (6.3 g) in dimethyl sulfoxide (63 ml) at room temperature over a period of 15 minutes. After being stirred for 30 minutes, 2-chlorobenzyl chloride (7.54 g) was added in one portion to the mixture and then the resultant mixture was stirred for 24 hours at room temperature. The mixture was poured into water and the resulting precipitate was collected by filtration. The crude product was purified by column chromatography on silica gel (30 g) with methylene chloride as an eluent to afford a solid, which was recrystallized from a mixture of diethyl ether and n-hexane to give 8-(2-chlorobenzyloxy)-2-methylimidazo[1,2-a]pyridine (7.75 g).

50 mp : 97 to 98 °C

IR (Nujol) : 1535, 1280, 1260, 1100 cm<sup>-1</sup>

NMR (CDCl<sub>3</sub>, δ) : 2.46 (3H, s), 5.41 (2H, s), 6.26-6.73 (2H, m), 7.05-7.50 (4H, m), 7.52-7.83 (2H, m)

55

Preparation 12

The following compounds were obtained according to a similar manner to that of Preparation 11.

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(1) 8-(2-Methylbenzyloxy)-2-methylimidazo[1,2-a]pyridine

mp : 101 to 103 °C (recrystallized from a mixture of ethyl acetate and n-hexane)

IR (Nujol) : 1530, 1485, 1275, 1260, 1095 cm<sup>-1</sup>

5 NMR (CDCl<sub>3</sub>, δ) : 2.36 (3H, s), 2.43 (3H, s), 5.23 (2H, s), 6.28-6.63 (2H, m), 7.0-7.53 (5H, m), 7.59 (1H, dd, J=1.5Hz and 6Hz)

(2) 8-(1-Phenylethoxy)-2-methylimidazo[1,2-a]pyridine

NMR (CDCl<sub>3</sub>, δ) : 1.80 (3H, d, J=7Hz), 2.52 (3H, s), 5.50 (1H, q, J=7Hz), 6.06-6.56 (2H, m), 6.93-7.66 (7H, m)

(3) 8-(3-Chlorobenzyloxy)-2-methylimidazo[1,2-a]pyridine

10 mp : 108 to 110 °C (recrystallized from a mixture of ethyl acetate and n-hexane)

IR (Nujol) : 1590, 1530, 1490, 1275, 1260, 1160, 1100 cm<sup>-1</sup>

NMR (CDCl<sub>3</sub>, δ) : 2.46 (3H, s), 5.26 (2H, s), 6.25-6.75 (2H, m), 7.15-7.45 (4H, m), 7.50 (1H, s), 7.63 (1H, dd, J=2Hz and 6Hz)

(4) 8-(2-Bromobenzyloxy)-2-methylimidazo[1,2-a]pyridine

15 mp : 113 to 114 °C (recrystallized from diethyl ether)

NMR (CDCl<sub>3</sub>, δ) : 2.54 (3H, s), 5.43 (2H, s), 6.29-6.76 (2H, m), 7.10-7.80 (6H, m)

(5) 8-(2,6-Dichlorobenzyloxy)-2-methylimidazo[1,2-a]pyridine

mp : 157 to 160 °C

NMR (CDCl<sub>3</sub>, δ) : 2.43 (3H, s), 5.45 (2H, s), 6.46-6.76 (2H, m), 7.13-7.46 (4H, m), 7.56-7.76 (1H, m)

(6) 8-(2,4-Dichlorobenzyloxy)-2-methylimidazo[1,2-a]pyridine

mp : 140 to 141 °C (recrystallized from ethyl acetate)

IR (Nujol) : 1280, 1100 cm<sup>-1</sup>

NMR (CDCl<sub>3</sub>, δ) : 2.50 (3H, s), 5.36 (2H, s), 6.20-6.73 (2H, m), 7.10-7.80 (5H, m)

25 Preparation 13

A solution of 2-amino-3-(2-methylbenzylamino)-pyridine (3.25 g) and chloroacetone (1.26 ml) in ethanol (65 ml) was refluxed for 18 hours and then evaporated in vacuo. To the residue was added aqueous sodium bicarbonate solution and the mixture was extracted with methylene chloride. The extract was washed with 30 brine, dried over magnesium sulfate, and evaporated in vacuo. The oily residue was purified by column chromatography on silica gel (40 g) with a mixture of methylene chloride and ethyl acetate (10:1) as an eluent to give 8-(2-methylbenzylamino)-2-methylimidazo[1,2-a]pyridine (1.80 g).

NMR (CDCl<sub>3</sub>, δ) : 2.38 (3H, s), 2.42 (3H, s), 4.40 (2H, d, J=6Hz), 5.06-5.46 (1H, broad s), 6.04 (1H, d, J=7.5Hz), 6.56 (1H, t, J=7Hz), 7.10-7.56 (6H, m)

35

Preparation 14

8-(2-Chlorobenzylamino)-2-methylimidazo[1,2-a]pyridine was obtained according to a similar manner to that of Preparation 13.

40 NMR (CDCl<sub>3</sub>, δ) : 2.43 (3H, s), 4.56 (2H, d, J=6Hz), 5.36-5.76 (1H, m), 5.96 (1H, d, J=7Hz), 6.52 (1H, t, J=7Hz), 7.06-7.63 (6H, m)

Preparation 15

45 To a solution of 37% aqueous formaldehyde (2.38 g) in acetic acid (38 ml) was added dropwise 50% aqueous dimethylamine (2.63 g) with ice-cooling over a period of 10 minutes and the mixture was stirred for an additional 10 minutes. The mixture was heated at 50-55 °C for 2 hours after an addition of 8-(2-chlorobenzyloxy)-2-methylimidazo[1,2-a]pyridine (7.6 g) thereto and then evaporated in vacuo. The residue was basified with aqueous sodium hydroxide and extracted with methylene chloride. The extract was washed with water, dried over magnesium sulfate and evaporated in vacuo. The residual solid was recrystallized from a mixture of diethyl ether and n-hexane to give 8-(2-chlorobenzyloxy)-3-dimethylaminomethyl-2-methylimidazo[1,2-a]pyridine (7.85 g).

50 mp : 100 to 101 °C

IR (Nujol) : 1550, 1295, 1285 cm<sup>-1</sup>

55 NMR (CDCl<sub>3</sub>, δ) : 2.26 (6H, s), 2.50 (3H, s), 3.63 (2H, s), 5.43 (2H, s), 6.30-6.80 (2H, m), 7.10-7.46 (3H, m), 7.50-7.93 (2H, m)

Preparation 16

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The following compounds were obtained according to a similar manner to that of Preparation 15.

(1) 8-(2-Methylbenzoyloxy)-3-dimethylaminomethyl-2-methylimidazo[1,2-a]pyridine

mp : 65 to 67 °C (recrystallized from petroleum ether)

IR (Nujol) : 1535, 1270, 1085, 1010 cm<sup>-1</sup>

5 NMR (CDCl<sub>3</sub>, δ) : 2.21 (6H, s), 2.40 (3H, s), 2.45 (3H, s), 3.60 (2H, s), 5.26 (2H, s), 6.30-6.77 (2H, m), 7.07-7.56 (4H, m), 7.81 (1H, dd, J = 1.5Hz and 6Hz)

(2) 8-(1-Phenylethoxy)-3-dimethylaminomethyl-2-methylimidazo[1,2-a]pyridine

NMR (CDCl<sub>3</sub>, δ) : 1.80 (3H, d, J = 7Hz), 2.23 (6H, s), 2.50 (3H, s), 3.60 (2H, s), 5.50 (1H, q, J = 7Hz), 6.25 (1H, dd, J = 1Hz and 6Hz), 6.46 (1H, t, J = 6Hz), 7.16-7.56 (5H, m), 7.71 (1H, dd, J = 1Hz and 6Hz)

10 (3) 8-(3-Chlorobenzoyloxy)-3-dimethylaminomethyl-2-methylimidazo[1,2-a]pyridine

mp : 71 to 72 °C (recrystallized from a mixture of diethyl ether and n-hexane)

IR (Nujol) : 1540, 1290, 1275 cm<sup>-1</sup>

NMR (CDCl<sub>3</sub>, δ) : 2.22 (6H, s), 2.46 (3H, s), 3.63 (2H, s), 5.29 (2H, s), 6.30-6.79 (2H, m), 7.16-7.46 (3H, m), 7.52 (1H, s), 7.83 (1H, dd, J = 2Hz and 6Hz)

15 (4) 8-(4-Chlorobenzoyloxy)-3-dimethylaminomethyl-2-methylimidazo[1,2-a]pyridine

mp : 132 to 134 °C

NMR (DMSO-d<sub>6</sub>, δ) : 2.12 (6H, s), 2.30 (3H, s), 3.6 (2H, s), 5.25 (2H, s), 6.60-6.80 (2H, m), 7.45 (4H, s), 7.76-7.96 (1H, m)

(5) 8-(2-Bromobenzoyloxy)-3-dimethylaminomethyl-2-methylimidazo[1,2-a]pyridine

20 mp : 107 to 108 °C (recrystallized from petroleum ether)

NMR (CDCl<sub>3</sub>, δ) : 2.22 (6H, s), 2.46 (3H, s), 3.60 (2H, s), 5.37 (2H, s), 6.27-6.73 (2H, m), 6.93-7.73 (4H, m), 7.80 (1H, dd, J = 2Hz and 6Hz)

(6) 8-(2,6-Dichlorobenzoyloxy)-3-dimethylaminomethyl-2-methylimidazo[1,2-a]pyridine

mp : 141 to 145 °C

25 NMR (CDCl<sub>3</sub>, δ) : 2.25 (6H, s), 2.45 (3H, s), 3.63 (2H, s), 5.50 (2H, s), 6.53-6.83 (2H, m), 7.16-7.50 (3H, m), 7.85 (1H, dd, J = 3Hz and 5Hz)

(7) 8-(3,4-Dichlorobenzoyloxy)-3-dimethylaminomethyl-2-methylimidazo[1,2-a]pyridine

mp : 96 to 98 °C

NMR (CDCl<sub>3</sub>, δ) : 2.23 (6H, s), 2.46 (3H, s), 3.60 (2H, s), 5.25 (2H, s), 6.36-6.80 (2H, m), 7.20-7.66 (3H, m), 7.83 (1H, dd, J = 2Hz and 7Hz)

30 (8) 8-(2,4-Dichlorobenzoyloxy)-3-dimethylaminomethyl-2-methylimidazo[1,2-a]pyridine

mp : 90 to 92 °C

NMR (CDCl<sub>3</sub>, δ) : 2.23 (6H, s), 2.46 (3H, s), 3.63 (2H, s), 5.36 (2H, s), 6.26-6.76 (2H, m), 7.23 (1H, dd, J = 2Hz and 8Hz), 7.40 (1H, d, J = 2Hz), 7.56 (1H, d, J = 8Hz), 7.80 (1H, dd, J = 2Hz and 7Hz)

35 (9) 8-Benzylxyloxy-3-dimethylaminomethylimidazo[1,2-a]pyridine

mp : 86 to 87 °C

NMR (CDCl<sub>3</sub>, δ) : 2.23 (6H, s), 3.66 (2H, s), 5.33 (2H, s), 6.36-6.76 (2H, m), 7.20-7.60 (6H, m), 7.90 (1H, dd, J = 2Hz and 6Hz)

(10) 8-Benzylxyloxy-3-dimethylaminomethyl-2-phenylimidazo[1,2-a]pyridine

40 mp : 87 to 89 °C (recrystallized from a mixture of ethyl acetate and n-hexane)

NMR (CDCl<sub>3</sub>, δ) : 2.23 (6H, s), 3.83 (2H, s), 5.40 (2H, s), 6.30-6.80 (2H, m), 7.20-8.13 (11H, m)

(11) 8-(2-Methylbenzylamino)-3-dimethylaminomethyl-2-methylimidazo[1,2-a]pyridine

NMR (CDCl<sub>3</sub>, δ) : 2.22 (6H, s), 2.38 (6H, s), 3.58 (2H, s), 4.36 (2H, d, J = 6Hz), 5.0-5.43 (1H, broad s), 6.06 (1H, d, J = 7Hz), 6.59 (1H, t, J = 7Hz), 7.05-7.45 (4H, m), 7.55 (1H, d, J = 7Hz)

45 (12) 8-(2-Chlorobenzylamino)-3-dimethylaminomethyl-2-methylimidazo[1,2-a]pyridine

NMR (CDCl<sub>3</sub>, δ) : 2.25 (6H, s), 2.45 (3H, s), 3.62 (2H, s), 4.60 (2H, d, J = 6Hz), 5.40-5.83 (1H, m), 6.03 (1H, d, J = 7Hz), 6.60 (1H, t, J = 7Hz), 7.07-7.56 (4H, m), 7.60 (1H, d, J = 7Hz)

Preparation 17

50 Methyl iodide (3.48 g) was added dropwise to a solution of 8-(2-chlorobenzoyloxy)-3-dimethylaminomethyl-2-methylimidazo[1,2-a]pyridine (7.8 g) in acetone (100 ml) at room temperature and the mixture was stirred for 24 hours. The resulting precipitate was collected by filtration, washed with acetone, and dried in a desiccator to give 8-(2-chlorobenzoyloxy)-3-trimethylammoniomethyl-2-methylimidazo[1,2-a]pyridine iodide (11.35 g).

mp : > 165 °C (decomp.)

IR (Nujol) : 1540, 1400, 1360, 1290 cm<sup>-1</sup>

NMR (DMSO-d<sub>6</sub>, δ) : 2.50 (3H, s), 3.20 (9H, s), 5.10 (2H, s), 5.39 (2H, s), 6.98 (2H, broad d, J = 4Hz), 7.30-

7.86 (4H, m), 8.55 (1H, broad-t,  $J = 4\text{Hz}$ ).

Preparation 18

5 The following compounds were obtained according to a similar manner to that of Preparation 17.

(1) 8-(2-Methylbenzyloxy)-3-trimethylammoniomethyl-2-methylimidazo[1,2-a]pyridine iodide  
mp : >175 °C (decomp.)  
IR (Nujol) : 1545, 1490, 1285, 1270  $\text{cm}^{-1}$   
NMR (DMSO-d<sub>6</sub>,  $\delta$ ) : 2.38 (3H, s), 2.46 (3H, s), 3.13 (9H, s), 5.02 (2H, s), 5.28 (2H, s), 6.9-7.6 (6H, m), 8.45 (1H, t,  $J = 3.5\text{Hz}$ )

(2) 8-(1-Phenylethoxy)-3-trimethylammoniomethyl-2-methylimidazo[1,2-a]pyridine iodide  
mp : 158 °C (decomp.)  
NMR (DMSO-d<sub>6</sub>,  $\delta$ ) : 1.63 (3H, d,  $J = 6\text{Hz}$ ), 2.49 (3H, s), 3.10 (9H, s), 4.96 (2H, s), 5.78 (1H, q  $J = 6\text{Hz}$ ), 6.53-7.0 (2H, m), 7.11-7.65 (5H, m), 8.35 (1H, broad d,  $J = 6\text{Hz}$ )

(3) 8-(3-Chlorobenzyloxy)-3-trimethylammoniomethyl-2-methylimidazo[1,2-a]pyridine iodide  
mp : >153 °C (decomp.)  
IR (Nujol) : 1540, 1290, 1080  $\text{cm}^{-1}$   
NMR (DMSO-d<sub>6</sub>,  $\delta$ ) : 2.49 (3H, s), 3.16 (9H, s), 5.06 (2H, s), 5.39 (2H, s), 6.86-7.1 (2H, m), 7.33-7.73 (4H, m), 8.40-8.63 (1H, m)

(4) 8-(4-Chlorobenzyloxy)-3-trimethylammoniomethyl-2-methylimidazo[1,2-a]pyridine iodide  
mp : >180 °C (decomp.)  
NMR (DMSO-d<sub>6</sub>,  $\delta$ ) : 2.52 (2H, s), 3.22 (9H, s), 5.10 (2H, s), 5.33 (2H, s), 6.80-7.10 (2H, m), 7.30-7.70 (4H, m), 8.54 (1H, broad t,  $J = 3\text{Hz}$ )

(5) 8-(2-Bromobenzyloxy)-3-trimethylammoniomethyl-2-methylimidazo[1,2-a]pyridine iodide  
mp : >160 °C (decomp.)  
NMR (DMSO-d<sub>6</sub>,  $\delta$ ) : 2.47 (3H, s), 3.14 (9H, s), 5.01 (2H, s), 5.32 (2H, s), 6.86-7.06 (2H, m), 7.23-7.86 (4H, m), 8.36-8.63 (1H, m)

(6) 8-(2,6-Dichlorobenzyloxy)-3-trimethylammoniomethyl-2-methylimidazo[1,2-a]pyridine iodide  
mp : 270 to 275 °C (decomp.)

(7) 8-(3,4-Dichlorobenzyloxy)-3-trimethylammoniomethyl-2-methylimidazo[1,2-a]pyridine iodide  
mp : 190 °C (decomp.)  
NMR (DMSO-d<sub>6</sub>,  $\delta$ ) : 2.43 (3H, s), 3.13 (9H, s), 5.00 (2H, s), 5.45 (2H, s), 6.46-6.76 (2H, m), 7.36-7.83 (3H, m), 8.45 (1H, dd,  $J = 2\text{Hz}$  and  $6\text{Hz}$ )

(8) 8-(2,4-Dichlorobenzyloxy)-3-trimethylammoniomethyl-2-methylimidazo[1,2-a]pyridine iodide  
mp : 187 °C (decomp.)  
NMR (DMSO-d<sub>6</sub>,  $\delta$ ) : 2.50 (3H, s), 3.20 (9H, s), 5.03 (2H, s), 5.35 (2H, s), 6.86-7.10 (2H, m), 7.50 (1H, dd,  $J = 2\text{Hz}$  and  $8\text{Hz}$ ), 7.68 (1H, d,  $J = 2\text{Hz}$ ), 7.75 (1H, d,  $J = 8\text{Hz}$ ), 8.43-8.63 (1H, m)

(9) 8-Benzyl-3-trimethylammoniomethylimidazo[1,2-a]pyridine iodide  
mp : 202 °C (decomp.)  
NMR (DMSO-d<sub>6</sub>,  $\delta$ ) : 3.16 (9H, s), 5.10 (2H, s), 5.36 (2H, s), 6.70-7.20 (2H, m), 7.26-7.73 (5H, m), 7.86 (1H, s), 8.56 (1H, dd,  $J = 2\text{Hz}$  and  $6\text{Hz}$ )

(10) 8-Benzyl-3-trimethylammoniomethyl-2-phenylimidazo[1,2-a]pyridine iodide  
mp : 159 °C (decomp.)  
NMR (DMSO-d<sub>6</sub>,  $\delta$ ) : 2.90 (9H, s), 5.23 (2H, s), 5.33 (2H, s), 6.90-7.10 (2H, m), 7.23-8.00 (10H, m), 8.56 (1H, dd,  $J = 3\text{Hz}$  and  $5\text{Hz}$ )

(11) 8-(2-Methylbenzylamino)-3-trimethylammoniomethyl-2-methylimidazo[1,2-a]pyridine iodide  
mp : 190 °C (decomp.)  
NMR (DMSO-d<sub>6</sub>,  $\delta$ ) : 2.35 (3H, s), ca. 2.4-2.7 (3H, s), 3.12 (9H, s), 4.45 (2H, d,  $J = 6\text{Hz}$ ), 4.85 (2H, s), 6.08 (1H, d,  $J = 8\text{Hz}$ ), 6.35-6.95 (2H, m), 7.06-7.36 (4H, m), 8.03 (1H, d,  $J = 7\text{Hz}$ )

(12) 8-(2-Chlorobenzylamino)-3-trimethylammoniomethyl-2-methylimidazo[1,2-a]pyridine iodide  
mp : >140 °C (decomp.)  
NMR (DMSO-d<sub>6</sub>,  $\delta$ ) : 2.53 (3H, s), 3.16 (9H, s), 4.55 (2H, d,  $J = 6\text{Hz}$ ), 4.98 (2H, s), 6.03 (1H, d,  $J = 8\text{Hz}$ ), 6.56-6.93 (2H, m), 7.10-7.63 (4H, m), 8.11 (1H, d,  $J = 7\text{Hz}$ )

Example 1

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A solution of 2-amino-3-benzyloxyppyridine (3 g) and 3-chloro-5-hexen-2-one (2.981 g) in ethanol (15 ml) was stirred and refluxed for 45 hours and then evaporated in vacuo. To the residue was added an aqueous solution of sodium bicarbonate and the mixture was extracted with ethyl acetate. The extract was washed with water, dried over magnesium sulfate and evaporated in vacuo. The oily residue was purified by column

5 chromatography on silica gel (50 g) using methylene chloride and then chloroform as eluents. The eluate with chloroform was evaporated in vacuo and the residual solid was recrystallized from diisopropyl ether to give 8-benzyloxy-3-allyl-2-methylimidazo[1,2-a]pyridine (0.31 g).

mp : 90.5 to 91.5 °C

IR (Nujol) : 1530, 1275 cm<sup>-1</sup>

10 NMR (CDCl<sub>3</sub>, δ) : 2.43 (3H, s), 3.43-3.66 (2H, m), 4.69-5.20 (2H, m), 5.30 (2H, s), ca. 5.4-6.2 (1H, m), 6.23-6.69 (2H, m), 7.13-7.58 (6H, m)

| Analysis Calcd. for C <sub>18</sub> H <sub>18</sub> N <sub>2</sub> O : |                                |                      |                     |
|--|--------------------------------|----------------------|---------------------|
| 15   | C: 77.67;<br>Found : C: 78.06; | H: 6.52;<br>H: 6.61; | N: 10.06<br>N: 9.94 |
|  |                                |                      |                     |

20 Example 2

A solution of 2-amino-3-benzyloxyppyridine (2 g) and 3-tosyloxy-5-hexyn-2-one (2.66 g) in ethanol (15 ml) was stirred and refluxed for 24 hours and then evaporated in vacuo. To the residue was added an aqueous solution of sodium bicarbonate and the mixture was extracted with ethyl acetate. The extract was washed with water, dried over magnesium sulfate and evaporated in vacuo. The oily residue was purified by column chromatography on silica gel (50 g) using chloroform as an eluent to give a solid, which was recrystallized from a mixture of methylene chloride and diethyl ether to give 8-benzyloxy-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine (0.855 g).

mp : 112 to 112.5 °C

IR (Nujol) : 3270, 1570, 1535, 1280, 1265, 1085, 1010 cm<sup>-1</sup>

30 NMR (CDCl<sub>3</sub>, δ) : 2.05 (1H, t, J=3Hz), 2.48 (3H, s), 3.73 (2H, d, J=3Hz), 5.33 (2H, s), 6.31-6.78 (2H, m), 7.20-7.76 (6H, m)

| Analysis Calcd. for C <sub>18</sub> H <sub>16</sub> N <sub>2</sub> O : |                                |                      |                      |
|--|--------------------------------|----------------------|----------------------|
| 35   | C: 78.24;<br>Found : C: 78.40; | H: 5.84;<br>H: 5.72; | N: 10.14<br>N: 10.30 |
|  |                                |                      |                      |

40 Example 3

8-(2-Phenylethoxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine was obtained by reacting 2-amino-3-(2-phenylethoxy)pyridine with 3-mesyloxy-5-hexyn-2-one according to similar manners to those of Examples 1 and 2.

45 mp : 114 to 116 °C (recrystallized from a mixture of ethyl acetate and n-hexane)

IR (Nujol) : 3295, 3095, 2100 cm<sup>-1</sup>

NMR (CDCl<sub>3</sub>, δ) : 2.07 (1H, t, J=3Hz), 2.49 (3H, s), 3.30 (2H, t, J=8Hz), 3.76 (2H, d, J=3Hz), 4.37 (2H, t, J=8Hz), 6.33-6.86 (2H, m), 7.30 (5H, s), 7.68 (1H, dd, J=1Hz and 7Hz)

| Analysis Calcd. for C <sub>19</sub> H <sub>18</sub> N <sub>2</sub> O : |                                |                      |                    |
|--|--------------------------------|----------------------|--------------------|
| 50   | C: 78.59;<br>Found : C: 78.43; | H: 6.25;<br>H: 6.11; | N: 9.65<br>N: 9.98 |
|  |                                |                      |                    |

55 Example 4

A solution of 2-amino-3-(2-methylbenzyloxy)pyridine (5 g) and 3-tosyloxy-5-hexyn-2-one (7.45 g) in

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ethanol (35 ml) was heated under reflux for 28 hours and then evaporated in vacuo. The residue was dissolved in ethyl acetate and the solution was allowed to stand at ambient temperature. The resultant precipitate was collected by filtration and dissolved in a mixture of methylene chloride and aqueous sodium bicarbonate. The organic layer was separated, washed with saturated sodium chloride aqueous solution, 5 treated with silica gel and activated charcoal successively, and evaporated in vacuo.

The crystalline residue was recrystallized from ethyl acetate to give 8-(2-methylbenzyloxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine (1.44 g).

mp : 138 to 140 °C  
IR (Nujol) : 3270, 1570, 1535 cm<sup>-1</sup>

10 NMR (CDCl<sub>3</sub>, δ) : 2.04 (1H, t, J=3Hz), 2.38 (3H, s), 2.44 (3H, s), 3.75 (2H, d, J=3Hz), 5.28 (2H, s), 6.45 (1H, dd, J=1Hz and 8Hz), 6.66 (1H, t, J=8Hz), 7.06-7.30 (3H, m), 7.37-7.55 (1H, m), 7.70 (1H, dd, J=1Hz and 8Hz)

15

| Analysis, Calcd. for C <sub>19</sub> H <sub>18</sub> N <sub>2</sub> O : |                          |                      |                    |
|---|--------------------------|----------------------|--------------------|
| Found :   | C : 78.59;<br>C : 78.69; | H: 6.25;<br>H: 6.11; | N: 9.65<br>N: 9.74 |
|   |                          |                      |                    |

20

Example 5

The following compounds were prepared according to similar manners to those of Examples 1, 2, 3 and 4.

25 (1) 8-(2-Ethylbenzyloxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine  
mp : 109 to 110 °C (recrystallized from a mixture of ethyl acetate and n-hexane)  
IR (Nujol) : 3275 cm<sup>-1</sup>  
NMR (CDCl<sub>3</sub>, δ) : 1.24 (3H, t, J=8Hz), 2.03 (1H, t, J=3Hz), 2.43 (3H, s), 2.76 (2H, q, J=8Hz), 3.74 (2H, d, J=3Hz), 5.31 (2H, s), 6.49 (1H, d, J=7Hz), 6.68 (1H, t, J=7Hz), 7.13-7.43 (3H, m), 7.49-7.66 (1H, m), 7.81 (1H, d, J=7Hz)

30

| Analysis Calcd. for C <sub>20</sub> H <sub>20</sub> N <sub>2</sub> O : |                        |                      |                    |
|--|------------------------|----------------------|--------------------|
| Found :  | C: 78.92;<br>C: 79.13; | H: 6.62;<br>H: 6.39; | N: 9.20<br>N: 9.23 |

35

(2) 8-(2-Isopropylbenzyloxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine  
mp : 108 to 109 °C (recrystallized from a mixture of ethyl acetate and n-hexane)  
IR (Nujol) : 3280 cm<sup>-1</sup>  
NMR (CDCl<sub>3</sub>, δ) : 1.26 (6H, d, J=7Hz), 2.03 (1H, t, J=3Hz), 2.43 (3H, s), 3.32 (1H, septet, J=7Hz), 3.74 (2H, d, J=3Hz), 5.36 (2H, s), 6.45 (1H, d, J=7Hz), 6.66 (1H, t, J=7Hz), 7.00-7.53 (4H, m), 7.69 (1H, d, J=7Hz)

40

45

| Analysis, Calcd. for C <sub>21</sub> H <sub>22</sub> N <sub>2</sub> O : |                        |                      |                    |
|---|------------------------|----------------------|--------------------|
| Found :   | C: 79.21;<br>C: 79.32; | H: 6.96;<br>H: 7.38; | N: 8.80<br>N: 8.68 |

50

(3) 8-(2-Chlorobenzyloxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine  
mp : 130 to 131 °C (recrystallized from ethyl acetate)  
IR (Nujol) : 3265, 1560, 1525 cm<sup>-1</sup>  
NMR (CDCl<sub>3</sub>, δ) : 2.05 (1H, t, J=3Hz), 2.46 (3H, s), 3.76 (2H, d, J=3Hz), 5.42 (2H, s), 6.42 (1H, d, J=7Hz), 6.66 (1H, t, J=7Hz), 7.15-7.50 (3H, m), 7.53-7.70 (1H, m), 7.72 (1H, d, J=7Hz)

55

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| Analysis, Calcd. for C <sub>18</sub> H <sub>15</sub> ClN <sub>2</sub> O : |                        |                      |                    |
|---|------------------------|----------------------|--------------------|
| Found :   | C: 69.57;<br>C: 69.58; | H: 4.86;<br>H: 5.13; | N: 9.01<br>N: 9.06 |
|   |                        |                      |                    |

5

(4) 8-(3-Chlorobenzoyloxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine.  
mp : 110 to 111 °C (recrystallized from a mixture of ethyl acetate and n-hexane)

IR (Nujol) : 3200, 1542 cm<sup>-1</sup>

10 NMR (CDCl<sub>3</sub>, δ) : 2.04 (1H, t, J=3Hz), 2.46 (3H, s), 3.76 (2H, d, J=3Hz), 5.29 (2H, s), 6.43 (1H, d, J=7Hz), 6.66 (1H, t, J=7Hz), 7.18-7.40 (3H, m), 7.49 (1H, s), 7.71 (1H, d, J=7Hz)

| Analysis Calcd. for C <sub>18</sub> H <sub>15</sub> ClN <sub>2</sub> O: |                        |                      |                    |
|---|------------------------|----------------------|--------------------|
| Found :   | C: 69.57;<br>C: 69.86; | H: 4.86;<br>H: 4.79; | N: 9.11<br>N: 9.11 |
|   |                        |                      |                    |

15

(5) 8-(4-Chlorobenzoyloxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine

mp : 173 to 175 °C (recrystallized from ethyl acetate)

20 IR (Nujol) : 3295 cm<sup>-1</sup>

NMR (CDCl<sub>3</sub>, δ) : 2.05 (1H, t, J=3Hz), 2.48 (3H, s), 3.76 (2H, d, J=3Hz), 5.30 (2H, s), 6.32-6.83 (2H, m), 7.19-7.56 (4H, m), 7.72 (1H, dd, J=2Hz, 6Hz)

| Analysis Calcd. for C <sub>18</sub> H <sub>15</sub> ClN <sub>2</sub> O : |                        |                      |                    |
|--|------------------------|----------------------|--------------------|
| Found :  | C: 69.57;<br>C: 69.45; | H: 4.86;<br>H: 4.55; | N: 9.01<br>N: 9.18 |
|  |                        |                      |                    |

25

(6) 8-(2-Bromobenzoyloxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine

mp : 156 to 157 °C (recrystallized from ethyl acetate)

IR (Nujol) : 3150, 2100, 1535 cm<sup>-1</sup>

NMR (CDCl<sub>3</sub>, δ) : 2.02-2.17 (1H, m), 2.46 (3H, s), 3.76 (2H, d, J=3Hz), 5.38 (2H, s), 6.40 (1H, d, J=7.5Hz), 6.65 (1H, t, J=7.5Hz), 7.03-7.40 (2H, m), 7.50-7.80 (3H, m)

30

| Analysis Calcd. for C <sub>18</sub> H <sub>15</sub> BrN <sub>2</sub> O : |                        |                      |                    |
|--|------------------------|----------------------|--------------------|
| Found :  | C: 60.86;<br>C: 61.01; | H: 4.26;<br>H: 4.45; | N: 7.89<br>N: 7.84 |
|  |                        |                      |                    |

35

(7) 8-(2-Fluorobenzoyloxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine

mp : 123 to 125 °C (recrystallized from a mixture of ethyl acetate and n-hexane)

IR (Nujol) : 3300, 3275 cm<sup>-1</sup>

40 NMR (CDCl<sub>3</sub>, δ) : 2.06 (1H, t, J=3Hz), 2.49 (3H, s), 3.77 (2H, d, J=3Hz), 5.40 (2H, s), 6.52 (1H, d, J=7Hz), 6.69 (1H, t, J=7Hz), 6.92-7.63 (4H, m), 7.73 (1H, d, J=7Hz)

45

| Analysis, Calcd. for C <sub>18</sub> H <sub>15</sub> FN <sub>2</sub> O : |                        |                      |                    |
|--|------------------------|----------------------|--------------------|
| Found :  | C: 73.45;<br>C: 73.72; | H: 5.14;<br>H: 5.02; | N: 9.52<br>N: 9.45 |
|  |                        |                      |                    |

50 (8) 8-(2,6-Dimethylbenzoyloxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine

mp : 165 to 168 °C (recrystallized from a mixture of ethanol and n-hexane)

IR (Nujol) : 3185 cm<sup>-1</sup>

55 NMR (CDCl<sub>3</sub>, δ) : 2.06 (1H, t, J=3Hz), 2.39 and 2.40 (each s, total 9H), 3.76 (2H, d, J=3Hz), 5.23 (2H, s), 6.53-6.87 (2H, m), 6.94-7.28 (3H, m), 7.73 (1H, dd, J=2Hz and 7Hz)

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| Analysis Calcd. for C <sub>20</sub> H <sub>20</sub> N <sub>2</sub> O : |                        |                      |                    |
|--|------------------------|----------------------|--------------------|
| Found :  | C: 78.92;<br>C: 78.95; | H: 6.62;<br>H: 6.38; | N: 9.20<br>N: 9.06 |
|  |                        |                      |                    |

5

(9) 8-(2,6-Dichlorobenzyl)oxy-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine  
mp : 183 to 184 °C (decomp.) (recrystallized from a mixture of methylene chloride and diisopropyl ether)

IR (Nujol) : 3180, 1540 cm<sup>-1</sup>

10 NMR (CDCl<sub>3</sub>, δ) : 2.06 (1H, t, J = 3Hz), 2.43 (3H, s), 3.75 (2H, d, J = 3Hz), 5.47 (2H, s), 6.57-6.89 (2H, m), 7.17-7.43 (3H, m) 7.76 (1H, dd, J = 2Hz and 7Hz)

| Analysis Calcd. for C <sub>18</sub> H <sub>14</sub> Cl <sub>2</sub> N <sub>2</sub> O : |                        |                      |                    |
|--|------------------------|----------------------|--------------------|
| Found :  | C: 62.62;<br>C: 63.14; | H: 4.09;<br>H: 4.29; | N: 8.11<br>N: 8.17 |
|  |                        |                      |                    |

15

(10) 8-(2-Naphthylmethoxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine  
mp : 138 to 139 °C (recrystallized from a mixture of ethyl acetate and n-hexane)

IR (Nujol) : 3290 cm<sup>-1</sup>

NMR (CDCl<sub>3</sub>, δ) : 2.04 (1H, t, J = 3Hz), 2.50 (3H, s), 3.74 (2H, d, J = 3Hz), 5.50 (2H, s), 6.33-6.78 (2H, m), 7.23-8.01 (8H, m)

(11) 8-(1-Naphthylmethoxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine

25

mp : 138 to 139 °C (recrystallized from a mixture of ethyl acetate and n-hexane)

IR (Nujol) : 3175, 2100 cm<sup>-1</sup>

NMR (CDCl<sub>3</sub>, δ) : 2.05 (1H, t, J = 3Hz), 2.46 (3H, s), 3.75 (2H, d, J = 3Hz), 5.80 (2H, s), 6.42-6.82 (2H, m), 7.22-8.26 (8H, m)

30

| Analysis Calcd. for C <sub>22</sub> H <sub>18</sub> N <sub>2</sub> O : |                        |                      |                    |
|--|------------------------|----------------------|--------------------|
| Found :  | C: 80.96;<br>C: 80.86; | H: 5.56;<br>H: 5.62; | N: 8.58<br>N: 8.86 |
|  |                        |                      |                    |

35

(12) 8-(1,2,3,4-Tetrahydro-1-naphthoxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine

mp : 139 to 141 °C (recrystallized from a mixture of ethanol and n-hexane)

IR (Nujol) : 3180 cm<sup>-1</sup>

NMR (CDCl<sub>3</sub>, δ) : 1.67-2.34 (5H, m), 2.44 (3H, s), 2.83-2.97 (2H, m), 3.78 (2H, d, J = 3Hz), 5.79 (1H, broad t, J = 4Hz), 6.57-6.89 (2H, m), 7.01-7.30 (3H, m), 7.36-7.54 (1H, m), 7.74 (1H, dd, J = 2Hz and 7Hz)

40

| Analysis Calcd. for C <sub>21</sub> H <sub>20</sub> N <sub>2</sub> O · 1/2H <sub>2</sub> O : |                        |                      |                    |
|--|------------------------|----------------------|--------------------|
| Found :  | C: 77.51;<br>C: 78.08; | H: 6.50;<br>H: 6.46; | N: 8.61<br>N: 8.66 |
|  |                        |                      |                    |

45

(13) 8-(Cinnamyl)oxy-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine (trans isomer)

mp : 130 to 131 °C (recrystallized from a mixture of ethyl acetate and n-hexane)

IR (Nujol) : 3280 cm<sup>-1</sup>

50

NMR (CDCl<sub>3</sub>, δ) : 2.04 (1H, t, J = 3Hz), 2.44 (3H, s), 3.75 (2H, d, J = 3Hz), 4.91 (2H, d, J = 5Hz), 6.28-6.90 (4H, m), 7.14-7.44 (5H, m), 7.71 (1H, d, J = 7.5Hz)

55

| Analysis Calcd. for C <sub>20</sub> H <sub>18</sub> N <sub>2</sub> O : |                        |                      |                    |
|--|------------------------|----------------------|--------------------|
| Found :  | C: 79.44;<br>C: 79.26; | H: 6.00;<br>H: 6.10; | N: 9.26<br>N: 9.24 |
|  |                        |                      |                    |

(14) 8-Cyclohexylmethoxy-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine

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mp : 118 to 119.5 °C (recrystallized from a mixture of ethyl acetate and n-hexane)  
 IR (Nujol) : 3200, 2100  $\text{cm}^{-1}$   
 NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 0.83-2.26 (1H, m), 2.03 (1H, t,  $J$  = 3Hz), 2.46 (3H, s), 3.80 (2H, d,  $J$  = 3Hz), 3.98 (2H, d,  $J$  = 6Hz), 6.48 (1H, d,  $J$  = 7Hz), 6.73 (1H, t,  $J$  = 7Hz), 7.71 (1H, dd,  $J$  = 1Hz and 7Hz)

5

| Analysis Calcd. for $\text{C}_{18}\text{H}_{22}\text{N}_2\text{O}$ : |                        |                      |                    |
|--|------------------------|----------------------|--------------------|
| Found :  | C: 76.56;<br>C: 77.05; | H: 7.85;<br>H: 7.54; | N: 9.92<br>N: 9.80 |
|  |                        |                      |                    |

10

(15) 8-Ethoxy-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine  
 mp : 163 to 165 °C (recrystallized from a mixture of ethyl acetate and n-hexane)  
 IR (Nujol) : 3190, 2100  $\text{cm}^{-1}$   
 NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.53 (3H, t,  $J$  = 7Hz), 2.03 (1H, t,  $J$  = 3Hz), 2.44 (3H, s), 3.73 (2H, d,  $J$  = 3Hz), 4.20 (2H, q,  $J$  = 7Hz), 6.40 (1H, d,  $J$  = 7Hz), 6.66 (1H, t,  $J$  = 7Hz), 7.65 (1H, dd,  $J$  = 1Hz and 7Hz)

15

20

| Analysis Calcd. for $\text{C}_{13}\text{H}_{14}\text{N}_2\text{O}$ : |                        |                      |                      |
|--|------------------------|----------------------|----------------------|
| Found :  | C: 72.87;<br>C: 73.04; | H: 6.59;<br>H: 6.48; | N: 13.07<br>N: 13.26 |
|  |                        |                      |                      |

25

(16) 8-(2-Methylbenzyloxy)-3-(1,2-propadienyl)-2-methylimidazo[1,2-a]pyridine  
 mp : 88 to 89 °C (recrystallized from a mixture of diethyl ether and petroleum ether)  
 IR (Nujol) : 1930  $\text{cm}^{-1}$

30

(17) 8-Benzylxy-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine hydrochloride  
 mp : 167 to 169 °C  
 IR (Nujol) : 3180, 2560 (broad), 2125, 1675, 1580, 1090  $\text{cm}^{-1}$

35

(18) 8-Benzylxy-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine  
 mp : 103 to 104 °C  
 IR (Nujol) : 3250, 2125, 1545, 1470, 1075  $\text{cm}^{-1}$

40

(19) 8-(1-Phenylethoxy)-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine  
 IR (film/NaCl) : 2100  $\text{cm}^{-1}$

45

(20) 8-(2-Methylbenzyloxy)-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine  
 mp : 87 to 89 °C  
 IR (Nujol) : 3225, 2125, 1530, 1060, 1050  $\text{cm}^{-1}$

50

(21) 8-(2-Chlorobenzylxy)-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine  
 mp : 95 to 95.5 °C  
 IR (Nujol) : 3280, 2120, 1575, 1545, 1295, 1070  $\text{cm}^{-1}$

55

(22) 8-(3-Chlorobenzylxy)-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine  
 mp : 81 to 83 °C (recrystallized from petroleum ether)  
 IR (Nujol) : 3130, 2095, 1570, 1540, 1285, 1055  $\text{cm}^{-1}$

60

(23) 8-(4-Chlorobenzylxy)-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine  
 mp : 130 to 131 °C (recrystallized from a mixture of ethyl acetate and n-hexane)  
 IR (Nujol) : 3240, 2100, 1530, 1490, 1360, 1275, 1265  $\text{cm}^{-1}$

65

(24) 8-(2-Bromobenzylxy)-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine  
 mp : 103 to 104 °C (recrystallized from a mixture of methylene chloride and diethyl ether)  
 IR (Nujol) : 3250, 2110, 1280, 1160  $\text{cm}^{-1}$

70

(25) 8-(2,6-Dichlorobenzylxy)-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine  
 mp : 129 to 130 °C (recrystallized from a mixture of ethyl acetate and n-hexane)  
 IR (Nujol) : 3290  $\text{cm}^{-1}$

75

(26) 8-(3,4-Dichlorobenzylxy)-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine  
 mp : 105 to 107 °C (recrystallized from a mixture of ethyl acetate and n-hexane)  
 IR (Nujol) : 3260, 2110, 1280, 1160  $\text{cm}^{-1}$

80

(27) 8-(2,4-Dichlorobenzylxy)-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine  
 mp : 123 to 124 °C (recrystallized from a mixture of ethyl acetate and n-hexane)  
 IR (Nujol) : 3250, 2110, 1280, 1060  $\text{cm}^{-1}$

85

(28) 8-Benzylxy-3-(2-propynylloxymethyl)imidazo[1,2-a]pyridine  
 mp : 84 to 85 °C (recrystallized from diisopropyl ether)

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IR (Nujol) : 3170, 2100  $\text{cm}^{-1}$

(29) 8-Benzyl-3-(2-propynyl)-2-phenylimidazo[1,2-a]pyridine

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 2.40 (1H, t,  $J$  = 1Hz), 4.20 (2H, d,  $J$  = 1Hz), 4.96 (2H, s), 5.33 (2H, s), 6.40-6.80 (2H, m), 7.20-7.70 (8H, m), 7.76-7.96 (3H, m)

5 (30) 8-(2-Methylbenzylamino)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine hydrochloride  
mp : 159 to 161  $^{\circ}\text{C}$  (recrystallized from a mixture of ethanol and n-hexane)

(31) 8-(2-Chlorobenzylamino)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine hydrochloride  
mp : 169  $^{\circ}\text{C}$  (decomp.) (recrystallized from a mixture of ethanol and diethyl ether)

(32) 8-Benzyl-3-allyloxy-2-phenylimidazo[1,2-a]pyridine

10 mp : 70 to 71  $^{\circ}\text{C}$

IR (Nujol) : 1535, 1280, 1265, 1195, 1100, 1050, 1015  $\text{cm}^{-1}$

(33) 8-Benzyl-3-(3-carboxy-2-propynyl)-2-methylimidazo[1,2-a]pyridine

mp : 151  $^{\circ}\text{C}$  (decomp.)

(34) 8-Benzyl-3-(3-ethoxycarbonyl-2-propynyl)-2-methylimidazo[1,2-a]pyridine

15 NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 1.33 (3H, t,  $J$  = 5Hz), 2.53 (3H, s), 4.20 (2H, s), 4.27 (2H, q,  $J$  = 5Hz), 4.90 (2H, s), 5.30 (2H, s), 6.50 (1H, dd,  $J$  = 1Hz and 5Hz), 6.65 (1H, t,  $J$  = 5Hz), 7.26-7.60 (5H, m), 7.75 (1H, dd,  $J$  = 1Hz and 5Hz)

Example 6

20 A solution of 2-amino-3-(2-methylbenzylamino)pyridine (2 g) and 3-mesyloxy-5-hexyn-2-one (1.78 g) in ethanol (40 ml) was refluxed for 31.5 hours and then evaporated in vacuo. The residue was treated with aqueous sodium bicarbonate solution and extracted with methylene chloride. The extract was washed with water, dried over magnesium sulfate, and evaporated in vacuo. The residue was purified by column chromatography on silica gel (40 g) with a mixture of methylene chloride and ethyl acetate (50:1 to 10:1) as an eluent to give 8-(2-methylbenzylamino)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine (0.82 g).

mp : 126 to 128  $^{\circ}\text{C}$  (recrystallized from diisopropyl ether)

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 2.04 (1H, t,  $J$  = 3Hz), 2.38 (3H, s), 2.40 (3H, s), 3.73 (2H, d,  $J$  = 3Hz), 4.39 (2H, d,  $J$  = 5Hz), 5.13-5.43 (1H, broad s), 6.08 (1H, d,  $J$  = 8Hz), 6.66 (1H, t,  $J$  = 7Hz), 7.0-7.43 (4H, m), 7.45 (1H, d,  $J$  = 6Hz)

Example 7

30 8-(2-Chlorobenzylamino)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine was obtained according to a similar manner to that of Example 6.

35 mp : 115 to 116.5  $^{\circ}\text{C}$  (recrystallized from a mixture of ethyl acetate and n-hexane)

NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 2.03 (1H, t,  $J$  = 3Hz), 2.40 (3H, s), 3.68 (2H, d,  $J$  = 3Hz), 4.52 (2H, d,  $J$  = 6Hz), 5.55 (1H, broad t,  $J$  = 6Hz), 5.95 (1H, d,  $J$  = 7Hz), 6.55 (1H, t,  $J$  = 7Hz), 6.96-7.55 (5H, m)

40

| Analysis Calcd. for $\text{C}_{18}\text{H}_{16}\text{ClN}_3$ : |                        |                      |                      |
|--|------------------------|----------------------|----------------------|
| Found :  | C: 69.79;<br>C: 69.97; | H: 5.21;<br>H: 5.48; | N: 13.56<br>N: 13.62 |

Example 8

45 Sodium bicarbonate (2.73 g) was added to a solution of 2-amino-3-(2-methylbenzyloxy)pyrazine (3.5 g) and 3-mesyloxy-5-hexyn-2-one (6.18 g) in ethanol (35 ml) and the mixture was refluxed for 12 hours. The mixture was poured into an aqueous solution of sodium bicarbonate and extracted with chloroform. The extract was washed with water, dried over magnesium sulfate, and evaporated in vacuo. The residue was purified by column chromatography on silica gel (200 g) with a mixture of chloroform and methanol (50:1) as an eluent to give 8-(2-methylbenzyloxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyrazine (0.182 g).

mp : 123 to 124  $^{\circ}\text{C}$

50 NMR ( $\text{CDCl}_3$ ,  $\delta$ ) : 2.08 (1H, t,  $J$  = 3Hz), 2.42 (3H, s), 2.45 (3H, s), 3.72 (2H, d,  $J$  = 3Hz), 5.55 (2H, s), 7.00-7.55 (4H, m), 7.35 (1H, d,  $J$  = 5Hz), 7.63 (1H, d,  $J$  = 5Hz)

Example 9

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8-(2-Methylbenzylamino)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyrazine hydrochloride was obtained according to a similar manner to that of Example 8.  
mp : 184 to 186 °C (decomp.)

5

| Analysis Calcd. for C <sub>18</sub> H <sub>18</sub> N <sub>4</sub> · HCl : |                        |                      |                        |                        |
|--|------------------------|----------------------|------------------------|------------------------|
| Found :  | C: 66.19;<br>C: 66.15; | H: 5.95;<br>H: 5.86; | N: 17.38;<br>N: 17.14; | Cl: 10.90<br>Cl: 10.52 |

10 IR (Nujol) : 3350, 3180, 2560, 1660, 1635, 1525 cm<sup>-1</sup>  
NMR (DMSO-d<sub>6</sub>, δ) : 2.37 (3H, s), ca. 2.3-2.7 (3H, s), 3.13 (1H, t, J = 3Hz), 4.08 (2H, d, J = 3Hz), 4.90 (2H, d, J = 6Hz), 7.00-7.50 (4H, m), 7.42 (1H, d, J = 5Hz), 7.92 (1H, d, J = 5Hz), 9.70-10.2 (1H, broad)

15 Example 10

20 A solution of 8-(2-methylbenzyloxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine (0.99 g) and 1N-sodium hydroxide solution (5.65 ml) in methanol (50 ml) was stirred for 72 hours at room temperature. The mixture was evaporated in vacuo and the residue was dissolved in chloroform. The solution was washed with brine, dried over magnesium sulfate, and evaporated in vacuo. The residue was purified by column chromatography on silica gel (14 g) with a mixture of chloroform and ethyl acetate (15:1) as an eluent to give 8-(2-methylbenzyloxy)-3-(1,2-propadienyl)-2-methylimidazo[1,2-a]pyridine (0.27 g).  
mp : 88 to 89 °C (recrystallized from a mixture of diethyl ether and petroleum ether).  
IR (Nujol) : 1930 cm<sup>-1</sup>  
NMR (CDCl<sub>3</sub>, δ) : 2.40 (3H, s), 2.46 (3H, s), 5.26 (2H, s), 5.26-5.43 (2H, m), 6.40-6.76 (3H, m), 7.06-7.30 (3H, m), 7.33-7.53 (1H, m), 8.10 (1H, dd, J = 1Hz and 7Hz)

30

| Analysis Calcd. for C <sub>19</sub> H <sub>18</sub> N <sub>2</sub> O : |                        |                      |                    |  |
|--|------------------------|----------------------|--------------------|--|
| Found :  | C: 78.59;<br>C: 78.86; | H: 6.25;<br>H: 6.02; | N: 9.65<br>N: 9.57 |  |

35 Example 11

40 To a solution of sodium hydride (61% in mineral oil dispersion) (7.39 g) in 2-propynyl alcohol (300 ml) was added 8-benzyloxy-3-trimethylammoniomethyl-2-methylimidazo[1,2-a]pyridine iodide (74.6 g), and the mixture was heated at 90-95 °C with stirring for 2.5 hours. After being cooled, the mixture was evaporated in vacuo and the residue was dissolved in methylene chloride. The solution was washed with water, dried over magnesium sulfate, and evaporated in vacuo. The oily residue was purified by column chromatography on Silica gel (200 g) with methylene chloride as an eluent and the fractions containing the object compound were combined. The resultant solution was treated with a solution of hydrogen chloride in ethanol to give 8-benzyloxy-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine hydrochloride (37.5 g).  
mp : 167 to 169 °C  
IR (Nujol) : 3180, 2560(broad), 2125, 1675, 1580, 1090 cm<sup>-1</sup>  
NMR (D<sub>2</sub>O, δ) : 2.56 (3H, s), 3.03 (1H, t, J = 2Hz), 4.31 (2H, d, J = 2Hz), 4.96 (2H, s), 5.29 (2H, s), 7.13-7.56 (7H, m), 8.01-8.14 (1H, m)

50

| Analysis Calcd. for C <sub>19</sub> H <sub>19</sub> CIN <sub>2</sub> O <sub>2</sub> : |                        |                      |                    |  |
|---|------------------------|----------------------|--------------------|--|
| Found :   | C: 66.57;<br>C: 66.37; | H: 5.59;<br>H: 5.33; | N: 8.17<br>N: 8.06 |  |

55 Example 12

A solution of 8-benzyloxy-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine hydrochloride (35.5 g) in hot water (700 ml) was neutralized with aqueous sodium hydroxide solution and extracted with

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methylene chloride. The extract was washed with water, dried over magnesium sulfate, treated with activated charcoal, and evaporated in vacuo. The residual solid was recrystallized from a mixture of methylene chloride and n-hexane to give 8-benzyloxy-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine (26.03 g).

5 mp : 103 to 104 °C

IR (Nujol) : 3250, 2125, 1545, 1470, 1075 cm<sup>-1</sup>

NMR (CDCl<sub>3</sub>, δ) : 2.43-2.60 (1H, m), 2.53 (3H, s), 4.07 (2H, d, J = 2Hz), 4.87 (2H, s), 5.33 (2H, s), 6.33-6.76 (2H, m), 7.20-7.60 (5H, m), 7.73 (1H, dd, J = 2Hz and 6Hz)

10 Example 13

To a solution of sodium hydride (63.6% in mineral oil dispersion, 0.285 g) in 2-propynyl alcohol (12 ml) was added 8-(2-methylbenzyloxy)-3-trimethylammoniomethyl-2-methylimidazo[1,2-a]pyridine iodide (3 g) and the mixture was heated at 85-100 °C for 1.5 hours. After being cooled, the mixture was poured into ice-water and the resulting precipitate was collected by filtration and dissolved in methylene chloride. The solution was treated successively with silica gel (4.5 g) and activated charcoal and evaporated in vacuo. The crystalline residue was recrystallized from a mixture of ethyl acetate and petroleum ether to give 8-(2-methylbenzyloxy)-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine (1.18 g).

mp : 87 to 89 °C

20 IR (Nujol) : 3225, 2125, 1530, 1060, 1050 cm<sup>-1</sup>

NMR (CDCl<sub>3</sub>, δ) : ca. 2.3-2.6 (1H), 2.40 (3H, s), 2.50 (3H, s), 4.06 (2H, d, J = 2Hz), 4.86 (2H, s), 5.29 (2H, s), 6.32-6.8 (2H, m), 7.0-7.56 (4H, m), 7.75 (1H, dd, J = 2Hz, 5Hz),

25

| Analysis Calcd. for C <sub>20</sub> H <sub>20</sub> N <sub>2</sub> O <sub>2</sub> : |                        |                      |                    |
|---|------------------------|----------------------|--------------------|
| Found :   | C: 74.98;<br>C: 74.98; | H: 6.29;<br>H: 6.05; | N: 8.74<br>N: 8.71 |
|   |                        |                      |                    |

30

Example 14

To a solution of sodium hydride (60% in mineral oil dispersion, 0.186 g) in 2-propynyl alcohol (8 ml) was added 8-(2-chlorobenzyloxy)-3-trimethylammoniomethyl-2-methylimidazo[1,2-a]pyridine iodide (2 g) and the mixture was heated at 90-95 °C with stirring for 1 hour. After being cooled, the mixture was poured into ice-water and the resulting precipitate was collected by filtration and dissolved in methylene chloride. The solution was treated successively with silica gel (1 g) and activated charcoal and evaporated in vacuo. The crystalline residue was recrystallized from a mixture of methylene chloride and n-hexane to give 8-(2-chlorobenzyloxy)-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine (0.9 g).

mp : 95 to 95.5 °C

40 IR (Nujol) : 3280, 2120, 1575, 1545, 1295, 1070 cm<sup>-1</sup>

NMR (CDCl<sub>3</sub>, δ) : ca. 2.4-2.7 (1H), 2.58 (3H, s), 4.13 (2H, d, J = 2Hz), 4.94 (2H, s), 5.47 (2H, s), 6.39-6.85 (2H, m), 7.10-7.50 (3H, m), 7.50-7.92 (2H, m)

45

| Analysis Calcd. for C <sub>19</sub> H <sub>17</sub> ClN <sub>2</sub> O <sub>2</sub> : |                        |                      |                    |
|---|------------------------|----------------------|--------------------|
| Found :   | C: 66.96;<br>C: 67.13; | H: 5.03;<br>H: 4.93; | N: 8.22<br>N: 8.12 |
|   |                        |                      |                    |

50

Example 15

The following compounds were obtained according to similar manners to those of Examples 11, 13 and 14.

55 (1) 8-(1-Phenylethoxy)-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine

IR (film/NaCl) : 2100 cm<sup>-1</sup>

NMR (CDCl<sub>3</sub>, δ) : 1.80 (3H, d, J = 6Hz), 2.40-2.60 (1H, m), 2.53 (3H, s), 4.05 (2H, d, J = 2Hz), 4.85 (2H, s), 5.52 (1H, q, J = 6Hz), 6.16-6.69 (2H, m), 7.11-7.56 (5H, m), 7.64 (1H, dd, J = 1Hz and 6Hz)

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(2) 8-(3-Chlorobenzylxy)-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine

mp : 81 to 83 °C (recrystallized from petroleum ether)

IR (Nujol) : 3130, 2095, 1570, 1540, 1285, 1055 cm<sup>-1</sup>

NMR (CDCl<sub>3</sub>, δ) : 2.43-2.60 (1H, m), 4.52 (3H, s), 4.08 (2H, d, J=2Hz), 4.88 (2H, s), 5.29 (2H, s), 6.32-6.80 (2H, m), 7.10-7.60 (4H, m), 7.75 (1H, dd, J=2Hz and 7Hz)

5

Analysis Calcd. for C<sub>19</sub>H<sub>17</sub>ClN<sub>2</sub>O<sub>2</sub> :

10

|       |                        |                      |                    |
|-------|------------------------|----------------------|--------------------|
| Found | C: 66.96;<br>C: 67.23; | H: 5.03;<br>H: 4.88; | N: 8.22<br>N: 8.15 |
|-------|------------------------|----------------------|--------------------|

(3) 8-(4-Chlorobenzylxy)-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine

mp : 130 to 131 °C (recrystallized from a mixture of ethyl acetate and n-hexane)

IR (Nujol) : 3240, 2100, 1530, 1490, 1360, 1275, 1265 cm<sup>-1</sup>

15

NMR (CDCl<sub>3</sub>, δ) : 2.38-2.58 (1H, m), 2.52 (3H, s), 4.06 (2H, d, J=2Hz), 4.86 (2H, s), 5.26 (2H, s), 6.26-6.73 (2H, m), 7.13-7.56 (4H, m), 7.76 (1H, dd, J=2Hz and 7Hz)

20

Analysis Calcd. for C<sub>19</sub>H<sub>17</sub>ClN<sub>2</sub>O<sub>2</sub> :

|         |                        |                      |                    |
|---------|------------------------|----------------------|--------------------|
| Found : | C: 66.96;<br>C: 66.91; | H: 5.03;<br>H: 4.95; | N: 8.22<br>N: 8.08 |
|---------|------------------------|----------------------|--------------------|

(4) 8-(2-Bromobenzylxy)-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine

25

mp : 103 to 104 °C (recrystallized from a mixture of methylene chloride and diethyl ether)

NMR (CDCl<sub>3</sub>, δ) : 2.43-2.63 (1H, m), 2.52 (3H, s), 4.08 (2H, d, J=2Hz), 4.88 (2H, s), 5.39 (2H, s), 6.33-6.81 (2H, n), 7.06-7.73 (4H, m), 7.75 (1H, dd, J=2Hz and 7Hz)

30

(5) 8-(2,6-Dichlorobenzylxy)-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine

mp : 129 to 130 °C (recrystallized from a mixture of ethyl acetate and n-hexane)

IR (Nujol) : 3290 cm<sup>-1</sup>

NMR (CDCl<sub>3</sub>, δ) : 2.45-2.60 (1H, m), 2.46 (3H, s), 4.06 (2H, d, J=2Hz), 4.86 (2H, s), 5.43 (2H, s), 6.60-6.85 (2H, m), 7.06-7.45 (3H, m), 7.80 (1H, dd, J=2Hz and 3Hz)

35

Analysis Calcd. for C<sub>19</sub>H<sub>16</sub>Cl<sub>2</sub>N<sub>2</sub>O<sub>2</sub> :

|         |                        |                      |                    |
|---------|------------------------|----------------------|--------------------|
| Found : | C: 60.81;<br>C: 61.31; | H: 4.30;<br>H: 4.33; | N: 7.47<br>N: 7.48 |
|---------|------------------------|----------------------|--------------------|

40

(6) 8-(3,4-Dichlorobenzylxy)-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine

mp : 105 to 107 °C (recrystallized from a mixture of ethyl acetate and n-hexane)

IR (Nujol) : 3260, 2110, 1280, 1160 cm<sup>-1</sup>

NMR (CDCl<sub>3</sub>, δ) : 2.40-2.60 (1H, m), 2.46 (3H, s), 4.05 (2H, d, J=2Hz), 4.83 (2H, s), 5.23 (2H, s), 6.26-6.80 (2H, m), 7.13-7.63 (3H, m), 7.75 (1H, dd, J=1Hz and 7Hz)

45

Analysis Calcd. for C<sub>19</sub>H<sub>16</sub>Cl<sub>2</sub>N<sub>2</sub>O<sub>2</sub> :

|         |                        |                      |                    |
|---------|------------------------|----------------------|--------------------|
| Found : | C: 60.81;<br>C: 61.26; | H: 4.30;<br>H: 4.23; | N: 7.47<br>N: 7.55 |
|---------|------------------------|----------------------|--------------------|

50

(7) 8-(2,4-Dichlorobenzylxy)-3-(2-propynylloxymethyl)-2-methylimidazo[1,2-a]pyridine

mp : 123 to 124 °C (recrystallized from a mixture of ethyl acetate and n-hexane)

IR (Nujol) : 3250, 2110, 1280, 1060 cm<sup>-1</sup>

55

NMR (CDCl<sub>3</sub>, δ) : 2.40-2.66 (1H, m), 2.50 (3H, s), 4.08 (2H, d, J=2Hz), 4.90 (2H, s), 5.36 (2H, s), 6.30-6.83 (2H, m), 7.20 (1H, dd, J=2Hz and 8Hz), 7.40 (1H, d, J=2Hz), 7.50 (1H, d, J=8Hz), 7.80 (1H, dd, J=1Hz and 7Hz)

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Analysis Calcd. for  $C_{19}H_{16}Cl_2N_2O_2$  :

|         |                        |                      |                    |
|---------|------------------------|----------------------|--------------------|
| Found : | C: 60.81;<br>C: 61.29; | H: 4.30;<br>H: 4.25; | N: 7.47<br>N: 7.41 |
|---------|------------------------|----------------------|--------------------|

5

(8) 8-Benzyl-3-(2-propynylloxy)imidazo[1,2-a]pyridine

mp : 84 to 85 °C (recrystallized from diisopropyl ether)

IR (Nujol) : 3170, 2100  $cm^{-1}$

10

NMR ( $CDCl_3$ ,  $\delta$ ) : 2.46 (1H, t,  $J$  = 2Hz), 4.13 (2H, d,  $J$  = 2Hz), 4.9 (2H, s), 5.33 (2H, s), 6.40-6.90 (2H, m), 7.23-7.60 (5H, m), 7.60 (1H, s), 7.83 (1H, dd,  $J$  = 2Hz and 7Hz)

Analysis Calcd. for  $C_{18}H_{16}N_2O_2$  :

|         |                        |                      |                    |
|---------|------------------------|----------------------|--------------------|
| Found : | C: 73.95;<br>C: 73.74; | H: 5.52;<br>H: 5.30; | N: 9.58<br>N: 9.47 |
|---------|------------------------|----------------------|--------------------|

15

(9) 8-Benzyl-3-(2-propynylloxy)imidazo[1,2-a]pyridine

NMR ( $CDCl_3$ ,  $\delta$ ) : 2.40 (1H, t,  $J$  = 1Hz), 4.20 (2H, d,  $J$  = 1Hz), 4.96 (2H, s), 5.33 (2H, s), 6.40-6.80 (2H, m), 7.20-7.70 (8H, m), 7.76-7.96 (3H, m)

20

(10) 8-(2-Methylbenzylamino)-3-(2-propynylloxy)imidazo[1,2-a]pyridine hydrochloride

mp : 159 to 161 °C (recrystallized from a mixture of ethanol and n-hexane)

NMR ( $DMSO-d_6$ ,  $\delta$ ) : 2.39 (3H, s), ca. 2.4-2.7 (3H, s), 3.50 (1H, t,  $J$  = 2Hz), 4.39 (2H, d,  $J$  = 2Hz), 4.50 (2H, broad d,  $J$  = 5Hz), 4.91 (2H, s), 6.73 (1H, d,  $J$  = 8Hz), 7.06-7.80 (6H, m), 7.91 (1H, d,  $J$  = 6Hz)

25

Analysis Calcd. for  $C_{20}H_{22}ClN_3O$  :

|         |                        |                      |                      |
|---------|------------------------|----------------------|----------------------|
| Found : | C: 67.50;<br>C: 67.87; | H: 6.23;<br>H: 6.43; | N: 11.81<br>N: 11.87 |
|---------|------------------------|----------------------|----------------------|

30

(11) 8-(2-Chlorobenzylamino)-3-(2-propynylloxy)imidazo[1,2-a]pyridine hydrochloride

mp : 169 °C (decomp.) (crystallized from a mixture of ethanol and diethyl ether)

NMR ( $DMSO-d_6$ ,  $\delta$ ) : 2.56 (3H, s), 3.52 (1H, t,  $J$  = 2Hz), 4.25 (2H, d,  $J$  = 2Hz), 4.85 (2H, broad s), 4.95 (2H, s), 6.73 (1H, d,  $J$  = 8Hz), 7.13-8.13 (7H, m)

35

Analysis Calcd. for  $C_{19}H_{19}Cl_2N_3O$  :

|         |                        |                      |                      |
|---------|------------------------|----------------------|----------------------|
| Found : | C: 60.65;<br>C: 60.71; | H: 5.09;<br>H: 5.39; | N: 11.17<br>N: 10.98 |
|---------|------------------------|----------------------|----------------------|

40

(12) 8-Benzyl-3-allyloxyimidazo[1,2-a]pyridine

mp : 70 to 71 °C

IR (Nujol) : 1535, 1280, 1265, 1195, 1100, 1050, 1015  $cm^{-1}$

45

NMR ( $CDCl_3$ ,  $\delta$ ) : 2.50 (3H, s), 3.95 (2H, d,  $J$  = 6Hz), 4.76 (2H, s), 5.0-5.5 (2H, m), 5.33 (2H, s), 5.6-6.3 (1H, m), 6.36-6.79 (2H, m), 7.20-7.62 (5H, m), 7.75 (1H, dd,  $J$  = 2Hz and 6Hz)

Analysis Calcd. for  $C_{19}H_{20}N_2O_2$  :

|         |                        |                      |                    |
|---------|------------------------|----------------------|--------------------|
| Found : | C: 74.00;<br>C: 74.35; | H: 6.54;<br>H: 6.48; | N: 9.08<br>N: 9.04 |
|---------|------------------------|----------------------|--------------------|

50

(13) 8-Benzyl-3-(3-carboxy-2-propynylloxy)imidazo[1,2-a]pyridine

mp : 151 °C (decomp.)

55

(14) 8-Benzyl-3-(3-ethoxycarbonyl-2-propynylloxy)imidazo[1,2-a]pyridine

NMR ( $CDCl_3$ ,  $\delta$ ) : 1.33 (3H, t,  $J$  = 5Hz), 2.53 (3H, s), 4.20 (2H, s), 4.27 (2H, q,  $J$  = 5Hz), 4.90 (2H, s), 5.30 (2H, s), 6.50 (1H, dd,  $J$  = 1Hz and 5Hz), 6.65 (1H, t,  $J$  = 5Hz), 7.26-7.60 (5H, m), 7.75 (1H, dd,  $J$  = 1Hz and 5Hz)

Example 16

To a solution of 8-benzyloxy-3-(2-propynyloxymethyl)-2-methylimidazo[1,2-a]pyridine (1 g) in tetrahydrofuran (10 ml) was added dropwise 10% solution of n-butyllithium in n-hexane (2.09 ml) at -60 °C 5 under a nitrogen atmosphere. After being stirred for 10 minutes the solution was treated with dry ice (1.4 g), allowed to warm to room temperature, and acidified with diluted acetic acid. The resulting precipitates were collected by filtration, washed with water, and recrystallized from methanol to give 8-benzyloxy-3-(3-carboxy-2-propynyloxymethyl)-2-methylimidazo[1,2-a]pyridine (0.67 g).  
 mp : 151 °C (decomp.)  
 10 NMR (DMSO-d<sub>6</sub>, δ) : 2.36 (3H, s), 4.30 (2H, s), 4.85 (2H, s), 5.26 (2H, s), 5.93 (1H, broad s), 6.80-7.03 (2H, m), 7.26-7.63 (5H, m), 7.86-8.10 (1H, m)

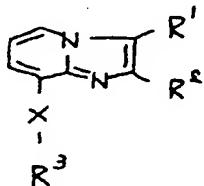
| Analysis Calcd. for C <sub>20</sub> H <sub>18</sub> N <sub>2</sub> O <sub>4</sub> : |                                |                      |                    |
|---|--------------------------------|----------------------|--------------------|
| 15  | C: 65.04;<br>Found : C: 65.07; | H: 5.72;<br>H: 5.54; | N: 7.36<br>N: 7.35 |
|   |                                |                      |                    |

Example 17

8-Benzylxy-3-(3-ethoxycarbonyl-2-propynyloxymethyl)-2-methylimidazo[1,2-a]pyridine was obtained by reacting 8-benzyloxy-3-(2-propynyloxymethyl)-2-methylimidazo[1,2-a]pyridine with ethyl chloroformate according to a similar manner to that of Example 16.  
 25 NMR (CDCl<sub>3</sub>, δ) : 1.33 (3H, t, J = 5Hz), 2.53 (3H, s), 4.20 (2H, s), 4.27 (2H, q, J = 5Hz), 4.90 (2H, s), 5.30 (2H, s), 6.50 (1H, dd, J = 1Hz and 5Hz), 6.65 (1H, t, J = 5Hz), 7.26-7.60 (5H, m), 7.75 (1H, dd, J = 1Hz and 5Hz)

**Claims**

30 1. Imidazoheterocyclic compounds of the formula:



40 wherein

R¹ is (C<sub>2</sub> - C<sub>6</sub>) alkenyl, (C<sub>2</sub> - C<sub>6</sub>) alkynyl,  
 (C<sub>3</sub> - C<sub>6</sub>) alkadienyl,

(C<sub>2</sub> - C<sub>6</sub>) alkenyloxy (C<sub>1</sub> - C<sub>6</sub>) alkyl,  
 (C<sub>2</sub> - C<sub>6</sub>) alkynyloxy (C<sub>1</sub> - C<sub>6</sub>) alkyl,

carboxy (C<sub>2</sub> - C<sub>6</sub>) alkynyloxy (C<sub>1</sub> - C<sub>6</sub>) alkyl or  
 (C<sub>1</sub> - C<sub>6</sub>) alkoxycarbonyl (C<sub>2</sub> - C<sub>6</sub>) alkynyloxy-(C<sub>1</sub> - C<sub>6</sub>) alkyl,

R² is hydrogen, (C<sub>1</sub> - C<sub>6</sub>) alkyl or aryl selected from a group consisting of phenyl, tolyl, xylyl, 1-naphthyl, 2-naphthyl, 1-anthryl and 2-anthryl,

50 R³ is ar (C<sub>1</sub> - C<sub>6</sub>) alkyl which has one or more suitable substituent(s) selected from a group consisting of (C<sub>1</sub> - C<sub>6</sub>) alkyl and halogen,

ar (C<sub>2</sub> - C<sub>6</sub>) alkenyl, benzene-condensed cyclo (C<sub>5</sub> - C<sub>6</sub>) alkyl, (C<sub>1</sub> - C<sub>6</sub>) alkyl having cyclo (C<sub>3</sub> - C<sub>6</sub>) alkyl or (C<sub>1</sub> - C<sub>6</sub>) alkyl, and

X is O or NH,

55 and a pharmaceutically acceptable salt thereof.

2. A compound of claim 1, wherein

R¹ is (C<sub>2</sub> - C<sub>6</sub>) alkenyl, (C<sub>2</sub> - C<sub>6</sub>) alkynyl, (C<sub>3</sub> - C<sub>6</sub>) alkadienyl,  
 (C<sub>2</sub> - C<sub>6</sub>) alkenyloxy (C<sub>1</sub> - C<sub>6</sub>) alkyl,

(C<sub>2</sub> - C<sub>6</sub>) alkynyoxy (C<sub>1</sub> - C<sub>6</sub>) alkyl,  
 carboxy (C<sub>2</sub> - C<sub>6</sub>) alkynyoxy (C<sub>1</sub> - C<sub>6</sub>) alkyl or  
 (C<sub>1</sub> - C<sub>6</sub>) alkoxy carbonyl (C<sub>2</sub> - C<sub>6</sub>) alkynyoxy (C<sub>1</sub> - C<sub>6</sub>) alkyl and  
 R<sup>3</sup> is ar (C<sub>1</sub> - C<sub>6</sub>) alkyl which has one or more suitable substituent(s) selected from a group  
 5 consisting of (C<sub>1</sub> - C<sub>6</sub>) alkyl and halogen, ar (C<sub>2</sub> - C<sub>6</sub>) alkenyl, benzene-condensed cyclo  
 (C<sub>5</sub> - C<sub>6</sub>) alkyl, (C<sub>1</sub> - C<sub>6</sub>) alkyl having cyclo (C<sub>3</sub> - C<sub>6</sub>) alkyl or (C<sub>1</sub> - C<sub>6</sub>) alkyl.

3. A compound of claim 2, wherein  
 R<sup>3</sup> is ar (C<sub>1</sub> - C<sub>6</sub>) alkyl which has one or more suitable substituent(s) selected from a group  
 10 consisting of (C<sub>1</sub> - C<sub>6</sub>) alkyl and halogen.

4. A compound of claim 3, wherein  
 R<sup>3</sup> is phenyl (C<sub>1</sub> - C<sub>6</sub>) alkyl or naphthyl (C<sub>1</sub> - C<sub>6</sub>) alkyl, each of which has 1 to 3 suitable  
 15 substituent(s) selected from a group consisting of (C<sub>1</sub> - C<sub>6</sub>) alkyl and halogen.

5. A compound of claim 4, wherein  
 R<sup>1</sup> is allyl, 2-propynyl, 1,2-propadienyl, allyloxymethyl, 2-propynyoxy methyl, 3-carboxy-2-prop-  
 20 pynyoxy methyl or 3-ethoxycarbonyl-2-propynyoxy methyl,  
 R<sup>2</sup> is hydrogen, methyl or phenyl, and  
 R<sup>3</sup> is benzyl which has 1 or 2 suitable substituent(s) selected from a group consisting of methyl,  
 ethyl, isopropyl, fluoro, chloro and bromo.

6. A compound of claim 5, which is selected from a group consisting of:  
 25 8-(2-methylbenzyloxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine,  
 8-(2-ethylbenzyloxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine,  
 8-(2-isopropylbenzyloxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine,  
 8-(2-chlorobenzyloxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine,  
 30 8-(3-chlorobenzyloxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine,  
 8-(4-chlorobenzyloxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine,  
 8-(2-bromobenzyloxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine,  
 8-(2-fluorobenzyloxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine,  
 35 8-(2,6-dimethylbenzyloxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine,  
 8-(2,6-dichlorobenzyloxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine,  
 8-(2-methylbenzylamino)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine,  
 8-(2-chlorobenzylamino)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine,  
 40 8-(2-methylbenzyloxy)-3-(1,2-propadienyl)-2-methylimidazo[1,2-a]pyridine,  
 8-(2-methylbenzyloxy)-3-(2-propynyoxy methyl)-2-methylimidazo[1,2-a]pyridine,  
 8-(2-chlorobenzyloxy)-3-(2-propynyoxy methyl)-2-methylimidazo[1,2-a]pyridine,  
 8-(3-chlorobenzyloxy)-3-(2-propynyoxy methyl)-2-methylimidazo[1,2-a]pyridine,  
 45 8-(4-chlorobenzyloxy)-3-(2-propynyoxy methyl)-2-methylimidazo[1,2-a]pyridine,  
 8-(2-bromobenzyloxy)-3-(2-propynyoxy methyl)-2-methylimidazo[1,2-a]pyridine,  
 8-(2,6-dichlorobenzyloxy)-3-(2-propynyoxy methyl)-2-methylimidazo[1,2-a]pyridine,  
 8-(3,4-dichlorobenzyloxy)-3-(2-propynyoxy methyl)-2-methylimidazo[1,2-a]pyridine,  
 8-(2,4-dichlorobenzyloxy)-3-(2-propynyoxy methyl)-2-methylimidazo[1,2-a]pyridine,  
 45 8-(2-methylbenzylamino)-3-(2-propynyoxy methyl)-2-methylimidazo[1,2-a]pyridine hydrochloride,  
 8-(2-chlorobenzylamino)-3-(2-propynyoxy methyl)-2-methylimidazo[1,2-a]pyridine hydrochloride.

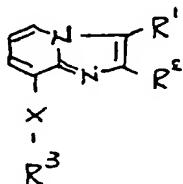
7. A compound of claim 2, wherein  
 R<sup>1</sup> is (C<sub>2</sub> - C<sub>6</sub>) alkynyl,  
 50 R<sup>2</sup> is (C<sub>1</sub> - C<sub>6</sub>) alkyl,  
 R<sup>3</sup> is phenyl (C<sub>2</sub> - C<sub>6</sub>) alkenyl, 1,2,3,4-tetrahydronaphthyl, (C<sub>1</sub> - C<sub>6</sub>) alkyl having cyclo (C<sub>3</sub> - C<sub>6</sub>)  
 alkyl or (C<sub>1</sub> - C<sub>6</sub>) alkyl, and  
 X is O.

55 8. A compound of claim 7, wherein  
 R<sup>1</sup> is 2-propynyl,  
 R<sup>2</sup> is methyl and  
 R<sup>3</sup> is cinnamyl, 1,2,3,4-tetrahydro-1-naphthyl, cyclohexylmethyl or ethyl.

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9. A compound of claim 8, which is selected from a group consisting of:  
 8-(cinnamyloxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine,  
 8-(1,2,3,4-tetrahydro-1-naphthylloxy)-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine,  
 8-cyclohexylmethoxy-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine, and  
 5 8-ethoxy-3-(2-propynyl)-2-methylimidazo[1,2-a]pyridine.

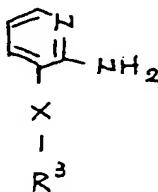
10. A process for preparing imidazoheterocyclic compounds of the formula:



wherein

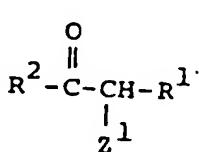
20 R¹ is (C<sub>2</sub> - C<sub>6</sub>) alkenyl, (C<sub>2</sub> - C<sub>6</sub>) alkynyl,  
 (C<sub>3</sub> - C<sub>6</sub>) alkadienyl,  
 (C<sub>2</sub> - C<sub>6</sub>) alkenyloxy (C<sub>1</sub> - C<sub>6</sub>) alkyl,  
 (C<sub>2</sub> - C<sub>6</sub>) alkynyloxy (C<sub>1</sub> - C<sub>6</sub>) alkyl,  
 carboxy (C<sub>2</sub> - C<sub>6</sub>) alkynyloxy (C<sub>1</sub> - C<sub>6</sub>) alkyl or (C<sub>1</sub> - C<sub>6</sub>) alkoxy carbonyl (C<sub>2</sub> - C<sub>6</sub>)  
 alkynyloxy-(C<sub>1</sub> - C<sub>6</sub>) alkyl,  
 25 R² is hydrogen, (C<sub>1</sub> - C<sub>6</sub>) alkyl or aryl selected from a group consisting of phenyl, tolyl, xylyl, 1-  
 naphthyl, 2-naphthyl, 1-anthryl and 2-anthryl,  
 R³ is ar (C<sub>1</sub> - C<sub>6</sub>) alkyl which has one or more suitable substituent(s) selected from a group  
 30 consisting of (C<sub>1</sub> - C<sub>6</sub>) alkyl and halogen,  
 ar (C<sub>2</sub> - C<sub>6</sub>) alkenyl, benzene-condensed cyclo (C<sub>5</sub> - C<sub>6</sub>) alkyl, (C<sub>1</sub> - C<sub>6</sub>) alkyl having cyclo  
 (C<sub>3</sub> - C<sub>6</sub>) alkyl or (C<sub>1</sub> - C<sub>6</sub>) alkyl, and  
 X is O or NH

or a salt thereof, which comprises reacting a compound of the formula:



wherein

45 R³ and X are each as defined above, or a salt thereof, with a compound of the formula:

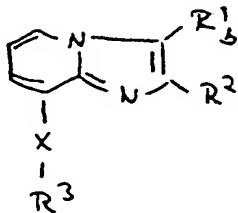


wherein

55 R¹ and R² are each as defined above, and Z¹ is an acid residue selected from a group consisting  
 of halogen and acyloxy, or a salt thereof.

11. A process for preparing imidazoheterocyclic compounds of the formula:

5



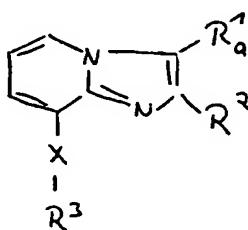
10

wherein

$R^2$ ,  $R^3$  and  $X$  are each as defined in claim 10, and  $R_b^1$  is cumulated ( $C_3$  -  $C_6$ ) alkadienyl, or a salt thereof, which comprises subjecting a compound of the formula:

15

20



25

wherein

$R^2$ ,  $R^3$  and  $X$  are each as defined in claim 10, and  $R_a^1$  is ( $C_2$  -  $C_6$ ) alkynyl, or a salt thereof, to isomerization reaction.

30

12. A process for preparing imidazoheterocyclic compounds of the formula:

35

40

wherein

$R^2$ ,  $R^3$  and  $X$  are each as defined in claim 10,

$R^4$  is ( $C_2$  -  $C_6$ ) alkylene, and

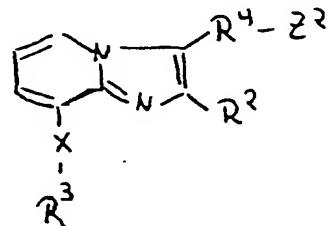
$R^5$  is ( $C_2$  -  $C_6$ ) alkenyl, ( $C_2$  -  $C_6$ ) alkynyl, carboxy ( $C_2$  -  $C_6$ ) alkynyl or ( $C_1$  -  $C_6$ )

45

alkoxycarbonyl- $(C_2$  -  $C_6)$  alkynyl, or a salt thereof, which comprises reacting a compound of the formula:

50

55



wherein

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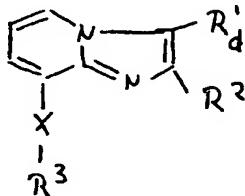
R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup> and X are each as defined above,  
 Z<sup>2</sup> is a leaving group,  
 or a salt thereof, with a compound of the formula:

5 R<sup>5</sup> -OH

wherein

R<sup>5</sup> is as defined above,  
 or a salt thereof.

10 13. A process for preparing imidazoheterocyclic compounds of the formula:



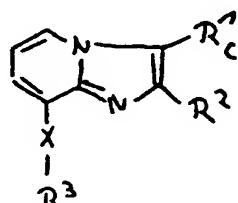
wherein

R<sup>2</sup>, R<sup>3</sup> and X each as defined in claim 10,

25 R'<sub>d</sub> is carboxy (C<sub>2</sub> - C<sub>6</sub>) alkynylloxy (C<sub>1</sub> - C<sub>6</sub>) alkyl, in which the triple bond always exists on the terminal carbon atom of the (C<sub>2</sub> - C<sub>6</sub>) alkyl moiety and this (C<sub>2</sub> - C<sub>6</sub>) alkynylloxy-(C<sub>1</sub> - C<sub>6</sub>) alkyl is substituted with carboxy on the terminal carbon atom of the (C<sub>2</sub> - C<sub>6</sub>) alkynyl moiety, or (C<sub>1</sub> - C<sub>6</sub>) alkoxy carbonyl (C<sub>2</sub> - C<sub>6</sub>) alkynylloxy (C<sub>1</sub> - C<sub>6</sub>) alkyl, in which the triple bond always exists on the terminal carbon atom of the (C<sub>2</sub> - C<sub>6</sub>) alkynyl moiety and this (C<sub>2</sub> - C<sub>6</sub>) alkynylloxy (C<sub>1</sub> - C<sub>6</sub>) alkyl is substituted with (C<sub>1</sub> - C<sub>6</sub>) alkoxy carbonyl on the terminal carbon atom of the (C<sub>2</sub> - C<sub>6</sub>) alkynyl moiety,

30 or a salt thereof,

which comprises subjecting a compound of the formula:



45 wherein

R<sup>2</sup>, R<sup>3</sup> and X are each as defined in claim 10, and

R'<sub>c</sub> is (C<sub>2</sub> - C<sub>6</sub>) alkynylloxy (C<sub>1</sub> - C<sub>6</sub>) alkyl, in which the triple bond always exists on the terminal carbon atom of the (C<sub>2</sub> - C<sub>6</sub>) alkynyl moiety,

50 or a salt thereof,

to acylation reaction.

14. A pharmaceutical composition which comprises, as an active ingredient, a compound of claim 1 or a pharmaceutically acceptable salt thereof in admixture with pharmaceutically acceptable carriers.

55 15. A compound of claim 1 or pharmaceutically acceptable salts thereof for use as a medicament.

16. A compound of claim 1 or pharmaceutically acceptable salts thereof for use in treating ulcer.

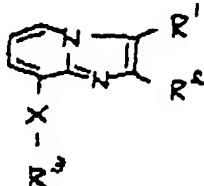
17. A compound of claim 1 or pharmaceutically acceptable salts thereof for the manufacture of a medicament for treating ulcer.

**Revendications**

5

1. Composés imidazohétérocycliques répondant à la formule :

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15

dans laquelle

R¹ est un groupe alcényyle en C<sub>2</sub> à C<sub>6</sub>, alcynyle en C<sub>2</sub> à C<sub>6</sub>, alcadiényle en C<sub>3</sub> à C<sub>6</sub>, (alcényloxy en C<sub>2</sub> à C<sub>6</sub>)(alkyle en C<sub>1</sub> à C<sub>6</sub>), (alcynyoxy en C<sub>2</sub> à C<sub>6</sub>)(alkyle en C<sub>1</sub> à C<sub>6</sub>), carboxy(alcynyoxy en C<sub>2</sub> à C<sub>6</sub>)(alkyle en C<sub>1</sub> à C<sub>6</sub>) ou

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(alcoxy en C<sub>1</sub> à C<sub>6</sub>)carbonyl(alcynyoxy en C<sub>2</sub> à C<sub>6</sub>)(alkyle en C<sub>1</sub> à C<sub>6</sub>),

R² est un atome d'hydrogène, un groupe alyle en C<sub>1</sub> à C<sub>6</sub> ou aryle choisi parmi les groupes phényle, tolyle, xylyle, 1-naphtyle, 2-naphtyle, 1-anthryle et 2-anthryle,

25

R³ est un groupe ar(alkyle en C<sub>1</sub> à C<sub>6</sub>) qui a un ou plusieurs substituants appropriés choisis parmi un groupe alkyle en C<sub>1</sub> à C<sub>6</sub> et un atome d'halogène,

25

un groupe ar(alcényyle en C<sub>2</sub> à C<sub>6</sub>), cyclo(alkyle en C<sub>5</sub> à C<sub>6</sub>) condensé sur le benzène, alkyle en C<sub>1</sub> à C<sub>6</sub> ayant un cyclo(alkyle en C<sub>3</sub> à C<sub>6</sub>) ou alkyle en C<sub>1</sub> à C<sub>6</sub>, et

X est O ou NH,

et un de leurs sels pharmaceutiquement acceptables.

30

2. Composé selon la revendication 1, dans lequel :

R¹ est un groupe alcényyle en C<sub>2</sub> à C<sub>6</sub>, alcynyle en C<sub>2</sub> à C<sub>6</sub>, alcadiényle en C<sub>3</sub> à C<sub>6</sub>, (alcényloxy en C<sub>2</sub> à C<sub>6</sub>)(alkyle en C<sub>1</sub> à C<sub>6</sub>),

35

(alcynyoxy en C<sub>2</sub> à C<sub>6</sub>)(alkyle en C<sub>1</sub> à C<sub>6</sub>), carboxy(alcynyoxy en C<sub>2</sub> à C<sub>6</sub>)(alkyle en C<sub>1</sub> à C<sub>6</sub>) ou

(alcoxy en C<sub>1</sub> à C<sub>6</sub>)carbonyl (alcynyoxy en C<sub>2</sub> à C<sub>6</sub>)(alkyle en C<sub>1</sub> à C<sub>6</sub>) et

R³ est un groupe ar(alkyle en C<sub>1</sub> à C<sub>6</sub>) qui a un ou plusieurs substituants appropriés, choisis parmi un groupe alkyle en C<sub>1</sub> à C<sub>6</sub> et un atome d'halogène,

40

un groupe ar(alcényyle en C<sub>2</sub> à C<sub>6</sub>), cyclo(alkyle en C<sub>5</sub> à C<sub>6</sub>) condensé sur le benzène,

alkyle en C<sub>1</sub> à C<sub>6</sub> ayant un groupe cyclo(alkyle en C<sub>3</sub> à C<sub>6</sub>) ou alkyle en C<sub>1</sub> à C<sub>6</sub>.

3. Composé selon la revendication 2, dans lequel :

R³ est un groupe ar(alkyle en C<sub>1</sub> à C<sub>6</sub>) qui a un ou plusieurs substituants appropriés, choisis parmi un groupe alkyle en C<sub>1</sub> à C<sub>6</sub> et un atome d'halogène,

4. Composé selon la revendication 3, dans lequel :

R³ est un groupe phényl(alkyle en C<sub>1</sub> à C<sub>6</sub>) ou naphtyl(alkyle en C<sub>1</sub> à C<sub>6</sub>), dont chacun a 1 à 3 substituants appropriés, choisis parmi un groupe alkyle en C<sub>1</sub> à C<sub>6</sub> et un atome d'halogène.

5. Composé selon la revendication 4, dans lequel :

R¹ est un groupe allyle, 2-propynyle, 1,2-propanediényle, allyloxyméthyle, 2-propynyoxyloxyméthyle, 3-carboxy-2-propynyoxyloxyméthyle ou 3-éthoxycarbonyl-2-propynyoxyloxyméthyle,

55

R² est un atome d'hydrogène, un groupe méthyle ou phényle, et

R³ est un groupe benzyle qui a 1 ou 2 substituants appropriés choisis parmi les groupes méthyle, éthyle, isopropyle, fluoro, chloro et bromo.

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6. Composé selon la revendication 5, qui est choisi parmi :

la 8-(2-méthylbenzyloxy)-3-(2-propynyl)-2-méthylimidazo[1,2-a]pyridine,  
 la 8-(2-éthylbenzyloxy)-3-(2-propynyl)-2-méthylimidazo[1,2-a]pyridine,  
 la 8-(2-isopropylbenzyloxy)-3-(2-propynyl)-2-méthylimidazo[1,2-a]pyridine,  
 5 la 8-(2-chlorobenzyloxy)-3-(2-propynyl)-2-méthylimidazo[1,2-a]pyridine,  
 la 8-(3-chlorobenzyloxy)-3-(2-propynyl)-2-méthylimidazo[1,2-a]pyridine,  
 la 8-(4-chlorobenzyloxy)-3-(2-propynyl)-2-méthylimidazo[1,2-a]pyridine,  
 la 8-(2-bromobenzyloxy)-3-(2-propynyl)-2-méthylimidazo[1,2-a]pyridine,  
 10 la 8-(2-fluorobenzyloxy)-3-(2-propynyl)-2-méthylimidazo[1,2-a]pyridine,  
 la 8-(2,6-diméthylbenzyloxy)-3-(2-propynyl)-2-méthylimidazo[1,2-a]pyridine,  
 la 8-(2,6-dichlorobenzyloxy)-3-(2-propynyl)-2-méthylimidazo[1,2-a]pyridine,  
 la 8-(2-méthylbenzylamino)-3-(2-propynyl)-2-méthylimidazo[1,2-a]pyridine,  
 15 la 8-(2-chlorobenzylamino)-3-(2-propynyl)-2-méthylimidazo[1,2-a]pyridine,  
 la 8-(2-méthylbenzyloxy)-3-(1,2-propadiényl)-2-méthylimidazo[1,2-a]pyridine,  
 la 8-(2-méthylbenzyloxy)-3-(2-propynylloxyméthyl)-2-méthylimidazo[1,2-a]pyridine,  
 la 8-(2-chlorobenzyloxy)-3-(2-propynylloxyméthyl)-2-méthylimidazo[1,2-a]pyridine,  
 20 la 8-(3-chlorobenzyloxy)-3-(2-propynylloxyméthyl)-2-méthylimidazo[1,2-a]pyridine,  
 la 8-(4-chlorobenzyloxy)-3-(2-propynylloxyméthyl)-2-méthylimidazo[1,2-a]pyridine,  
 la 8-(2-bromobenzyloxy)-3-(2-propynylloxyméthyl)-2-méthylimidazo[1,2-a]pyridine,  
 25 le chlorhydrate de 8-(2-méthylbenzylamino)-3-(2-propynylloxyméthyl)-2-méthylimidazo[1,2-a]pyridine,  
 le chlorhydrate de 8-(2-chlorobenzylamino)-3-(2-propynylloxyméthyl)-2-méthylimidazo[1,2-a]pyridine.

25 7. Composé selon la revendication 2, dans lequel :

R<sup>1</sup> est un groupe alcynyle en C<sub>2</sub> à C<sub>6</sub>,  
 R<sup>2</sup> est un groupe alkyle en C<sub>1</sub> à C<sub>6</sub>,  
 30 R<sup>3</sup> est un groupe phényl(alcényle en C<sub>2</sub> à C<sub>6</sub>), 1,2,3,4-tétrahydronaphthyle, alkyle en C<sub>1</sub> à C<sub>6</sub>  
 ayant un groupe cyclo(alkyle en C<sub>3</sub> à C<sub>6</sub>) ou (alkyle en C<sub>1</sub> à C<sub>6</sub>), et  
 X est O,

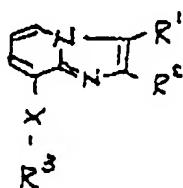
8. Composé selon la revendication 7 dans lequel :

R<sup>1</sup> est un groupe 2-propynyle,  
 R<sup>2</sup> est un groupe méthyle, et  
 35 R<sup>3</sup> est un groupe cinammyle, 1,2,3,4-tétrahydro-1-naphtyle, cyclohexylméthyle ou éthyle.

9. Composé selon la revendication 8, qui est choisi parmi :

la 8-(cinnamyloxy)-2-(2-propynyl)-2-méthylimidazo[1,2-a]pyridine,  
 40 la 8-(1,2,3,4-tétrahydro-1-naphtyloxy)-3-(2-propynyl)-2-méthylimidazo[1,2-a]pyridine,  
 la 8-cyclohexylméthoxy-3-(2-propynyl)-2-méthylimidazo[1,2-a]pyridine,  
 et  
 la 8-éthoxy-3-(2-propynyl)-2-méthylimidazo[1,2-a]pyridine.

45 10. Procédé de préparation de composés imidazohétérocycliques répondant à la formule :



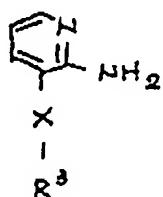
55 dans laquelle

R<sup>1</sup> est un groupe alcényle en C<sub>2</sub> à C<sub>6</sub>,  
 alcynyle en C<sub>2</sub> à C<sub>6</sub>,

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alcadiényle en  $C_3$  à  $C_6$ ,  
 (alcényloxy en  $C_2$  à  $C_6$ )(alkyle en  $C_1$  à  $C_6$ ),  
 (alcynyloxy en  $C_2$  à  $C_6$ )(alkyle en  $C_1$  à  $C_6$ ),  
 carboxy(alcynyloxy en  $C_2$  à  $C_6$ ) (alkyle en  $C_1$  à  $C_6$ ) ou  
 (alcoxy en  $C_1$  à  $C_6$ )carboxy (alcynyloxy en  $C_2$  à  $C_6$ )(alkyle en  $C_1$  à  $C_6$ ),  
 un atome d'hydrogène, un groupe alkyle en  $C_1$  à  $C_6$  ou aryle choisi parmi les groupes  
 phényle, tolyle, xylyle, 1-naphtyle, 2-naphtyle, 1-anthryle et 2-anthryle,  
 un groupe ar(alkyle en  $C_1$  à  $C_6$ ) qui a un ou ou plusieurs substituants appropriés choisis  
 parmi un groupe alkyle en  $C_1$  à  $C_6$  et un atome d'halogène,  
 un groupe ar(alcényle en  $C_2$  à  $C_6$ ), cyclo(alkyle en  $C_5$  à  $C_6$ ) condensé sur le benzène,  
 alkyle en  $C_1$  à  $C_6$  ayant un groupe cyclo(alkyle en  $C_3$  à  $C_6$ ) ou (alkyle en  $C_1$  à  $C_6$ ), et  
 O ou NH.  
 ou un de ses sels, qui comprend le fait de faire réagir un composé répondant à la formule

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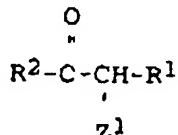


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dans laquelle  $R^3$  et  $X$  sont chacun tels que définis ci-dessus, ou un de ses sels, avec un composé répondant à la formule :

30

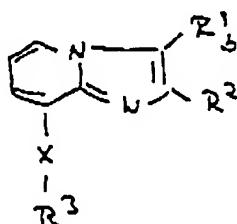


35

dans laquelle R<sup>1</sup> et R<sup>2</sup> sont chacun tels que définis ci-dessus, et Z<sup>1</sup> est un radical d'acide choisi parmi un atome d'halogène et un groupe acyloxy, ou un de ses sels.

## 11. Procédé de préparation de composés imidazohétérocycliques répondant à la formule :

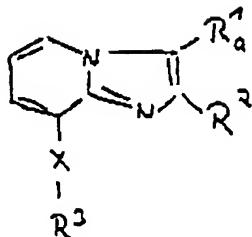
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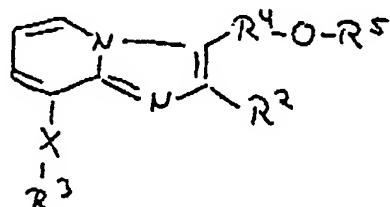
dans laquelle  $R^2$ ,  $R^3$  et  $X$  sont chacun tels que définis dans la revendication 10, et  $R_b^1$  est un alcadiényle en  $C_3$  à  $C_6$  cumulé, ou un de ses sels, qui comprend le fait de soumettre un composé répondant à la formule :

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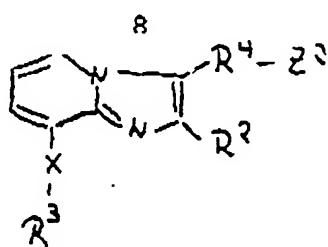


dans laquelle R<sup>2</sup>, R<sup>3</sup> et X sont chacun tels que définis dans la revendication 10, et R<sup>1</sup> est un groupe alcynyle en C<sub>2</sub> à C<sub>6</sub>, ou un de ses sels, à une réaction d'isomérisation.

15 12. Procédé de préparation de composés imidazohétérocycliques répondant à la formule :



dans laquelle  
 R<sup>2</sup>, R<sup>3</sup> et X sont chacun tels que définis dans la revendication 10,  
 R<sup>4</sup> est un groupe alkylène en C<sub>2</sub> à C<sub>6</sub>, et  
 30 R<sup>5</sup> est un groupe alcényle en C<sub>2</sub> à C<sub>6</sub>, alcynyle en C<sub>2</sub> à C<sub>6</sub>, carboxy(alcynyle en C<sub>2</sub> à C<sub>6</sub>) ou (alcoxy en C<sub>1</sub> à C<sub>6</sub>)carbonyl(alcynyle en C<sub>2</sub> à C<sub>6</sub>), ou un de ses sels, qui comprend le fait de faire réagir un composé répondant à la formule :

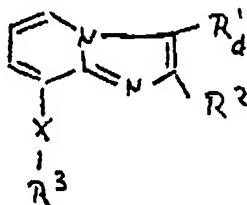


45 dans laquelle  
 R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup> et X sont chacun tels que définis ci-dessus,  
 Z<sup>2</sup> est un groupe partant,  
 ou un de ses sels, avec un composé répondant à la formule :

50 R<sup>5</sup>-OH

dans laquelle  
 R<sup>5</sup> est tel que défini ci-dessus ou un de ses sels.

55 13. Procédé de préparation de composés imidazohétérocycliques répondant à la formule :



10

dans laquelle

R<sup>2</sup>, R<sup>3</sup> et X  
R'<sub>d</sub> est

15

sont chacun tels que définis dans la revendication 10,  
un groupe carboxy(alcynyoxy en C<sub>2</sub> à C<sub>6</sub>)(alkyle en C<sub>1</sub> à C<sub>6</sub>), dans lequel la triple  
liaison existe toujours sur l'atome de carbone terminal de la partie alcynyle en C<sub>2</sub> à  
C<sub>6</sub> et ce groupe (alcynyoxy en C<sub>2</sub> à C<sub>6</sub>)(alkyle en C<sub>1</sub> à C<sub>6</sub>) est substitué par un  
groupe carboxy sur l'atome de carbone terminal de la partie alcynyle en C<sub>2</sub> à C<sub>6</sub>, ou  
un groupe (alcoxy en C<sub>1</sub> à C<sub>6</sub>)carbonyl(alcynyoxy en C<sub>2</sub> à C<sub>6</sub>)(alkyle en C<sub>1</sub> à C<sub>6</sub>),  
dans lequel la triple liaison existe toujours sur l'atome de carbone terminal de la  
partie alcynyle en C<sub>2</sub> à C<sub>6</sub> et ce groupe (alcynyoxy en C<sub>2</sub> à C<sub>6</sub>)(alkyle en C<sub>1</sub> à C<sub>6</sub>)  
qui est substitué par un groupe (alcoxy en C<sub>1</sub> à C<sub>6</sub>)carbonyle sur l'atome de  
carbone terminal de la partie alcynyle en C<sub>2</sub> à C<sub>6</sub>,

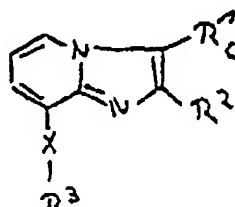
20

ou un de ses sels,

qui comprend le fait de soumettre un composé répondant à la formule :

25

30



35

dans laquelle

R<sup>2</sup>, R<sup>3</sup> et X  
R'<sub>c</sub> est

sont chacun tels que définis dans la revendication 10, et  
un groupe (alcynyoxy en C<sub>2</sub> à C<sub>6</sub>) (alkyle en C<sub>1</sub> à C<sub>6</sub>), dans lequel la triple liaison  
existe toujours sur l'atome de carbone terminal de la partie alcynyle en C<sub>2</sub> à C<sub>6</sub> ,

40

ou un de ses sels,

à une réaction d'acylation

45

14. Composition pharmaceutique qui comprend comme ingrédient actif un composé selon la revendication 1, ou un de ses sels pharmaceutiquement acceptables en mélange avec des supports pharmaceutiquement acceptables.

15. Composé selon la revendication 1 ou ses sels pharmaceutiquement acceptables pour l'utilisation comme médicament.

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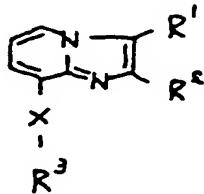
16. Composé selon la revendication 1, ou ses sels pharmaceutiquement acceptables pour l'utilisation dans le traitement des ulcères.

17. Composé selon la revendication 1, ou ses sels pharmaceutiquement acceptables pour la fabrication d'un médicament pour le traitement des ulcères.

55 **Patentansprüche**

1. Imidazo-heterocyclische Verbindungen der Formel:

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10      worin

      R¹    (C<sub>2</sub>-C<sub>6</sub>)Alkenyl, (C<sub>2</sub>-C<sub>6</sub>)Alkinyl,  
              (C<sub>3</sub>-C<sub>6</sub>)Alkadienyl,  
              (C<sub>2</sub>-C<sub>6</sub>)Alkenyloxy(C<sub>1</sub>-C<sub>6</sub>)alkyl,  
              (C<sub>2</sub>-C<sub>6</sub>)Alkinyloxy(C<sub>1</sub>-C<sub>6</sub>)alkyl,

15      Carboxy(C<sub>2</sub>-C<sub>6</sub>)alkinyloxy(C<sub>1</sub>-C<sub>6</sub>)alkyl oder  
              (C<sub>1</sub>-C<sub>6</sub>)alkoxycarbonyl(C<sub>2</sub>-C<sub>6</sub>)alkinyloxy(C<sub>1</sub>-C<sub>6</sub>)alkyl ist,

      R²    Wasserstoff, (C<sub>1</sub>-C<sub>6</sub>)Alkyl oder Aryl, ausgewählt aus der Gruppe, die aus Phenyl, Tollyl, Xylyl,  
              1-Naphthyl, 2-Naphthyl, 1-Anthryl und 2-Anthryl besteht, ist,

20      R³    Ar(C<sub>1</sub>-C<sub>6</sub>)alkyl, das einen oder mehrere geeignete Substituenten hat, die aus einer Gruppe  
              ausgewählt sind, die aus (C<sub>1</sub>-C<sub>6</sub>)Alkyl und Halogen besteht,  
              Ar(C<sub>2</sub>-C<sub>6</sub>)alkenyl, benzolkondensiertes Cyclo(C<sub>5</sub>-C<sub>6</sub>)alkyl,  
              (C<sub>1</sub>-C<sub>6</sub>)Alkyl mit Cyclo(C<sub>3</sub>-C<sub>6</sub>)alkyl oder (C<sub>1</sub>-C<sub>6</sub>)Alkyl ist, und

      X    O oder NH ist,  
              und ein pharmazeutisch unbedenkliches Salz hiervon.

25      2. Verbindung von Anspruch 1, worin

      R¹    (C<sub>2</sub>-C<sub>6</sub>)Alkenyl, (C<sub>2</sub>-C<sub>6</sub>)Alkinyl, (C<sub>3</sub>-C<sub>6</sub>)Alkadienyl,  
              (C<sub>2</sub>-C<sub>6</sub>)Alkenyloxy(C<sub>1</sub>-C<sub>6</sub>)alkyl,  
              (C<sub>2</sub>-C<sub>6</sub>)Alkinyloxy(C<sub>1</sub>-C<sub>6</sub>)alkyl,

30      Carboxy(C<sub>2</sub>-C<sub>6</sub>)alkinyloxy(C<sub>1</sub>-C<sub>6</sub>)alkyl oder  
              (C<sub>1</sub>-C<sub>6</sub>)alkoxycarbonyl(C<sub>2</sub>-C<sub>6</sub>)alkinyloxy(C<sub>1</sub>-C<sub>6</sub>)alkyl ist und

      R³    Ar(C<sub>1</sub>-C<sub>6</sub>)alkyl, das einen oder mehrere geeignete Substituenten hat, die aus der Gruppe  
              ausgewählt sind, die aus (C<sub>1</sub>-C<sub>6</sub>)Alkyl und Halogen besteht,  
              Ar(C<sub>2</sub>-C<sub>6</sub>)alkenyl, benzolkondensiertes Cyclo(C<sub>5</sub>-C<sub>6</sub>)alkyl,  
              (C<sub>1</sub>-C<sub>6</sub>)Alkyl mit Cyclo(C<sub>3</sub>-C<sub>6</sub>)alkyl oder (C<sub>1</sub>-C<sub>6</sub>)alkyl ist.

35      3. Verbindung von Anspruch 2, worin

      R³    Ar(C<sub>1</sub>-C<sub>6</sub>)alkyl ist, das einen oder mehrere geeignete Substituenten hat, die aus der Gruppe  
              ausgewählt sind, die aus (C<sub>1</sub>-C<sub>6</sub>)Alkyl und Halogen besteht.

40      4. Verbindung von Anspruch 3, worin

      R³    Phenyl(C<sub>1</sub>-C<sub>6</sub>)alkyl oder Naphthyl(C<sub>1</sub>-C<sub>6</sub>)alkyl ist, welches jedes 1 bis 3 geeignete Substituenten hat, die aus der Gruppe ausgewählt sind, die aus (C<sub>1</sub>-C<sub>6</sub>)Alkyl und Halogen besteht.

45      5. Verbindung von Anspruch 4, worin

      R¹    Allyl, 2-Propinyl, 1,2-Propadienyl, Allyloxymethyl, 2-Propinyloxymethyl, 3-Carboxy-2-propinyl-  
              oxymethyl oder 3-Ethoxycarbonyl-2-propinyloxymethyl ist,  
      R²    Wasserstoff, Methyl oder Phenyl ist, und  
      R³    Benzyl ist, welches ein oder zwei geeignete Substituenten hat, die aus der Gruppe ausgewählt sind, die aus Methyl, Ethyl, Isopropyl, Fluor, Chlor und Brom besteht.

50      6. Verbindung von Anspruch 5, die aus der Gruppe ausgewählt ist, die aus:

      8-(2-Methylbenzyloxy)-3-(2-propinyl)-2-methylimidazo[1,2-a]pyridin,  
      8-(2-Ethylbenzyloxy)-3-(2-propinyl)-2-methylimidazo[1,2-a]pyridin,  
      8-(2-Isopropylbenzyloxy)-3-(2-propinyl)-2-methylimidazo[1,2-a]pyridin,  
      8-(2-Chlorbenzyloxy)-3-(2-propinyl)-2-methylimidazo[1,2-a]pyridin,  
      8-(3-Chlorbenzyloxy)-3-(2-propinyl)-2-methylimidazo[1,2-a]pyridin,

8-(4-Chlorbenzyloxy)-3-(2-propinyl)-2-methylimidazo[1,2-a]pyridin,  
 8-(2-Brombenzyloxy)-3-(2-propinyl)-2-methylimidazo[1,2-a]pyridin,  
 8-(2-Fluorbenzyloxy)-3-(2-propinyl)-2-methylimidazo[1,2-a]pyridin,  
 8-(2,6-Dimethylbenzyloxy)-3-(2-propinyl)-2-methylimidazo[1,2-a]pyridin,  
 5 8-(2,6-Dichlorbenzyloxy)-3-(2-propinyl)-2-methylimidazo[1,2-a]pyridin,  
 8-(2-Methylbenzylamino)-3-(2-propinyl)-2-methylimidazo[1,2-a]pyridin,  
 8-(2-Chlorbenzylamino)-3-(2-propinyl)-2-methylimidazo[1,2-a]pyridin,  
 8-(2-Methylbenzyloxy)-3-(1,2-propadienyl)-2-methylimidazo[1,2-a]pyridin,  
 8-(2-Methylbenzyloxy)-3-(2-propinylloxyethyl)-2-methylimidazo[1,2-a]pyridin,  
 10 8-(2-Chlorbenzyloxy)-3-(2-propinylloxyethyl)-2-methylimidazo[1,2-a]pyridin,  
 8-(3-Chlorbenzyloxy)-3-(2-propinylloxyethyl)-2-methylimidazo[1,2-a]pyridin,  
 8-(4-Chlorbenzyloxy)-3-(2-propinylloxyethyl)-2-methylimidazo[1,2-a]pyridin,  
 8-(2-Brombenzyloxy)-3-(2-propinylloxyethyl)-2-methylimidazo[1,2-a]pyridin,  
 8-(2,6-Dichlorbenzyloxy)-3-(2-propinylloxyethyl)-2-methylimidazo[1,2-a]pyridin,  
 15 8-(3,4-Dichlorbenzyloxy)-3-(2-propinylloxyethyl)-2-methylimidazo[1,2-a]pyridin,  
 8-(2,4-Dichlorbenzyloxy)-3-(2-propinylloxyethyl)-2-methylimidazo[1,2-a]pyridin,  
 8-(2-Methylbenzylamino)-3-(2-propinylloxyethyl)-2-methylimidazo[1,2-a]pyridinhydrochlorid,  
 8-(2-Chlorbenzylamino)-3-(2-propinylloxyethyl)-2-methylimidazo[1,2-a]pyridinhydrochlorid

20 besteht.

7. Verbindung von Anspruch 2, worin

R<sup>1</sup> (C<sub>2</sub>-C<sub>6</sub>)Alkinyl ist.

R<sup>2</sup> (C<sub>1</sub>-C<sub>6</sub>)Alkyl ist,

25 R<sup>3</sup> Phenyl(C<sub>2</sub>-C<sub>6</sub>)alkenyl, 1,2,3,4-Tetrahydronaphthyl, (C<sub>1</sub>-C<sub>6</sub>)Alkyl mit Cyclo(C<sub>3</sub>-C<sub>6</sub>)alkyl oder (C<sub>1</sub>-C<sub>6</sub>)Alkyl ist, und

X O ist.

8. Verbindung von Anspruch 7, worin

30 R<sup>1</sup> 2-Propinyl ist,

R<sup>2</sup> Methyl ist und

R<sup>3</sup> Cinnamyl, 1,2,3,4-Tetrahydro-1-naphthyl, Cyclohexylmethyl oder Ethyl ist.

9. Verbindung von Anspruch 8, welche aus der Gruppe ausgewählt ist, die besteht aus:

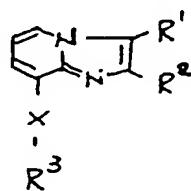
35 8-(Cinnamylloxy)-3-(2-propinyl)-2-methylimidazo[1,2-a]pyridin,

8-(1,2,3,4-Tetrahydro-1-naphthoxy)-3-(2-propinyl)-2-methylimidazo[1,2-a]pyridin,

8-Cyclohexylmethoxy-3-(2-propinyl)-2-methylimidazo[1,2-a]pyridin, und

8-Ethoxy-3-(2-propinyl)-2-methylimidazo[1,2-a]pyridin.

40 10. Verfahren zur Herstellung von Imidazo-heterocyclischen Verbindungen der Formel:



50

worin

R<sup>1</sup> (C<sub>2</sub>-C<sub>6</sub>)Alkenyl, (C<sub>2</sub>-C<sub>6</sub>)Alkinyl,  
 (C<sub>3</sub>-C<sub>6</sub>)Alkadienyl,

(C<sub>2</sub>-C<sub>6</sub>)Alkenyloxy(C<sub>1</sub>-C<sub>6</sub>)alkyl,

(C<sub>2</sub>-C<sub>6</sub>)Alkinyloxy(C<sub>1</sub>-C<sub>6</sub>)alkyl,

Carboxy(C<sub>2</sub>-C<sub>6</sub>)alkinyloxy(C<sub>1</sub>-C<sub>6</sub>)alkyl oder

(C<sub>1</sub>-C<sub>6</sub>)alkoxycarbonyl(C<sub>2</sub>-C<sub>6</sub>)alkinyloxy(C<sub>1</sub>-C<sub>6</sub>)alkyl ist,

55 R<sup>2</sup> Wasserstoff, (C<sub>1</sub>-C<sub>6</sub>)Alkyl oder Aryl, ausgewählt aus der Gruppe, die aus Phenyl, Tollyl, Xylyl,

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1-Naphthyl, 2-Naphthyl, 1-Anthryl und 2-Anthryl besteht, ist,

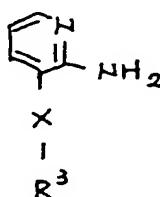
R<sup>3</sup> Ar(C<sub>1</sub>-C<sub>6</sub>)alkyl, das eine oder mehrere geeignete Substituenten hat, die aus einer Gruppe ausgewählt sind, die aus (C<sub>1</sub>-C<sub>6</sub>)Alkyl und Halogen besteht,

Ar(C<sub>2</sub>-C<sub>6</sub>)alkenyl, benzolkondensiertes Cyclo(C<sub>5</sub>-C<sub>6</sub>)alkyl,

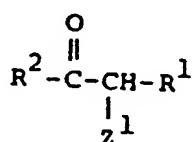
(C<sub>1</sub>-C<sub>6</sub>)Alkyl mit Cyclo(C<sub>3</sub>-C<sub>6</sub>)alkyl oder (C<sub>1</sub>-C<sub>6</sub>)Alkyl ist, und

X O oder NH ist,

oder ein pharmazeutisch unbedenkliches Salz hiervon, welches Reaktion einer Verbindung der Formel:

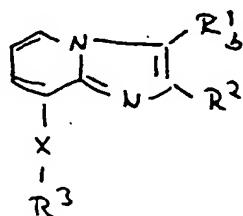


20 worin R<sup>3</sup> und X jeweils wie oben definiert sind, oder eines Salzes hiervon, mit einer Verbindung der Formel:

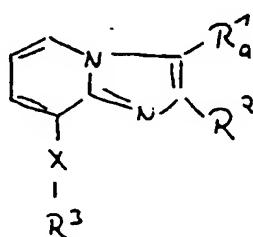


30 umfaßt, worin R<sup>1</sup> und R<sup>2</sup> jeweils wie oben definiert sind, und Z<sup>1</sup> ein saurer Rest ist, der aus der Gruppe ausgewählt wurde, die aus Halogen und Acyloxy besteht, oder ein Salz hiervon.

11. Verfahren zur Herstellung von Imidazo-heterocyclischen Verbindungen der Formel:



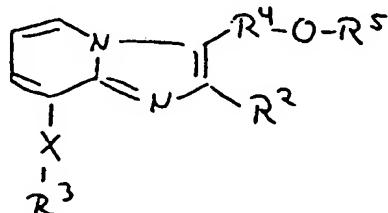
45 worin R<sup>2</sup>, R<sup>3</sup> und X jeweils wie in Anspruch 10 definiert sind, und R<sup>1</sup> kumulierte (C<sub>3</sub>-C<sub>6</sub>)Alkadienyl ist, oder ein Salz hiervon, welches Unterwerfung einer Verbindung der Formel:



worin R<sup>2</sup>, R<sup>3</sup> und X jeweils wie in Anspruch 10 definiert sind, und R<sup>1</sup> (C<sub>2</sub>-C<sub>6</sub>)Alkinyl ist, oder ein Salz hiervon, der Isomerisierungsreaktion umfaßt.

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12. Verfahren zur Herstellung von Imidazo-heterocyclischen Verbindungen der Formel



worin

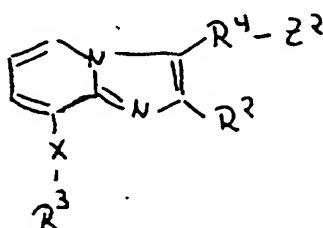
R<sup>2</sup>, R<sup>3</sup> und X jeweils wie in Anspruch 10 definiert sind,

R<sup>4</sup> (C<sub>2</sub>-C<sub>6</sub>)Alkylen ist, und

15 R<sup>5</sup> (C<sub>2</sub>-C<sub>6</sub>)Alkenyl, (C<sub>2</sub>-C<sub>6</sub>)Alkinyl, Carboxy(C<sub>2</sub>-C<sub>6</sub>)Alkinyl oder (C<sub>1</sub>-C<sub>6</sub>)Alkoxy carbonyl- (C<sub>2</sub>-C<sub>6</sub>)Alkinyl, oder ein Salz davon ist, welches umfaßt:

Reaktion einer Verbindung mit der Formel:

20



30

worin

R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup> und X jeweils wie oben definiert sind,

Z<sup>2</sup> eine Abgangsgruppe ist,

oder ein Salz hiervon, mit einer Verbindung der Formel:

35

R<sup>5</sup> -OH

worin

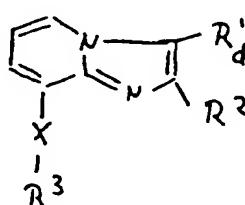
R<sup>5</sup> wie oben definiert ist,

oder ein Salz hiervon.

40

13. Verfahren zur Herstellung von Imidazo-heterocyclischen Verbindungen der Formel:

45



worin

R<sup>2</sup>, R<sup>3</sup> und X jeweils wie in Anspruch 10 definiert sind,

55 R<sup>4</sup> Carboxy(C<sub>2</sub>-C<sub>6</sub>)alkinyloxy(C<sub>1</sub>-C<sub>6</sub>)alkyl ist, in welcher die Dreifachbindung immer am terminalen Kohlenstoffatom des (C<sub>2</sub>-C<sub>6</sub>)Alkinylteils besteht und diesem (C<sub>2</sub>-C<sub>6</sub>)- Alkinylloxy(C<sub>1</sub>-C<sub>6</sub>)alkyl mit Carboxy am terminalen Kohlenstoffatom der (C<sub>2</sub>-C<sub>6</sub>)- Alkinylanteils substituiert ist,

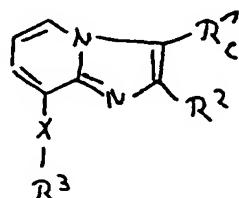
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oder ( $C_1$ - $C_6$ )Alkoxy carbonyl ( $C_2$ - $C_6$ )alkinyl oxy ( $C_1$ - $C_6$ )alkyl, in welcher die Dreifachbindung immer an dem terminalen Kohlenstoffatom des ( $C_2$ - $C_6$ )Alkinylanteils besteht und dieses ( $C_2$ - $C_6$ )Alkinyl oxy ( $C_1$ - $C_6$ )alkyl mit ( $C_1$ - $C_6$ )Alkoxy carbonyl an dem terminalen Kohlenstoffatom des ( $C_2$ - $C_6$ )Alkinylanteils substituiert ist,

5 oder ein Salz davon,

welches umfaßt:

Unterwerfung einer Verbindung der Formel:



worin

20  $R^2$ ,  $R^3$  und  $X$  jeweils wie in Anspruch 10 definiert sind, und

$R'_c$  ( $C_2$ - $C_6$ )Alkinyl oxy ( $C_1$ - $C_6$ )alkyl ist, in welcher die Dreifachbindung immer an dem terminalen Kohlenstoff des ( $C_2$ - $C_6$ )Alkinylanteils besteht,

oder ein Salz hiervon,  
der Acylierungsreaktion.

25

14. Pharmazeutische Zusammensetzung, die als einen aktiven Bestandteil eine Verbindung von Anspruch 1 oder ein pharmazeutisch unbedenkliches Salz hiervon in Beimischung mit einem pharmazeutisch unbedenklichen Träger umfaßt.

30 15. Verbindung von Anspruch 1 oder ein pharmazeutisches Salz hiervon zur Verwendung als Medikament.

16. Verbindung von Anspruch 1 oder pharmazeutisch unbedenkliche Salze hiervon zur Verwendung in der Behandlung von Geschwüren.

35 17. Verbindung von Anspruch 1 oder pharmazeutisch unbedenkliche Salze hiervon zur Herstellung eines Medikaments zur Behandlung von Geschwüren.

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